Photo: Mindy McCartt, Comm. Director, Oregon State Police, Sent 2/7/20 to OEM, Feb. 2020 Flood

Photo: East Oregonian, May 2020 Wind Storm

Photo: City of Umatilla, Feb. 2020 Flood

Photo: Umatilla County, Umatilla County Emergency Management, Weigh Station Fire, 2016

UMATILLA COUNTY
est. 1862

Photo: City of Umatilla, Sept. 2020 Wildfire

Photo: Pendleton National Weather Service

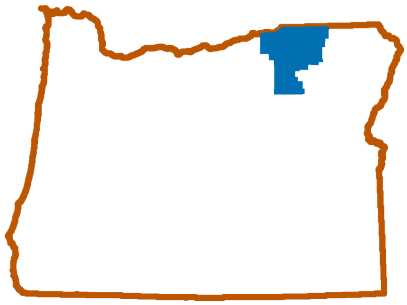
Photo: Pendleton National Weather Service, Sept. 2020 Wildfire Smoke

Photo: Pendleton National Weather Service

Umatilla County

MULTI-JURISDICTION NATURAL HAZARDS MITIGATION PLAN

- Adams
- Athena
- Echo
- Helix
- Hermiston
- Milton-Freewater
- Pendleton
- Pilot Rock
- Stanfield
- Ukiah



- Umatilla
- Weston
- Hermiston Irrigation District
- Stanfield Irrigation District
- Umatilla County Soil and Water Conservation District
- Walla Walla River Irrigation District

FEMA

Effective August 12, 2021 through August 11, 2026

The *2021 Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* is a living document that will be reviewed and updated periodically. It will be integrated with existing plans, policies, and programs. The Disaster Mitigation Act of 2000 (DMA2K) and the regulations contained in 44 CFR 201 require that jurisdictions maintain an approved NHMP to receive federal funds for pre- and post-disaster mitigation grants.

Comments, suggestions, corrections, and additions are encouraged to be submitted from all interested parties.

For further information and to provide comments, contact:

Robert Waldher, Planning Director
Umatilla County Department of Land Use Planning
216 SE 4th St.
Pendleton, OR 97801
Phone: 541-278-6252
Email: Robert.waldher@umatillacounty.net

Thomas Roberts, Emergency Manager
Umatilla County Sheriff's Office
4700 NW Pioneer Place
Pendleton, OR 97801
Phone: 541-966-3706
Email: thomas.roberts@umatillacounty.net

Mission:

To prevent loss and protect life, property, and the environment from natural hazards through coordination and cooperation among public and private partners. To mitigate the impacts of natural hazards and to increase the resilience of our community in our efforts to protect life, property, and the environment.

Umatilla County developed this Multi-Jurisdictional Natural Hazards Mitigation Plan (NHMP) through a partnership funded by the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP). In 2020, the Department of Land Conservation and Development (DLCD) applied for and received the HMGP grant from DR-4432 from FEMA through the Oregon Office of Emergency Management (OEM) to assist Umatilla County, the twelve incorporated cities, and four special districts (identified as plan holders because they have signed IGAs with DLCD) with the update to the expired *2014 Umatilla County NHMP*. This *2021 Umatilla County NHMP* is the result of a substantial collaborative effort between DLCD, Umatilla County, and all participating organizations (plan holders and others). The *2021 Umatilla County Natural Hazards Mitigation Plan* is structured to address the requirements contained in 44 CFR 201.6. Emphasis is placed on identifying and describing the unique attributes of the County, Cities, and Special Districts.

2021 Umatilla County MJNHMP List of Approvals

March 31, 2021	Tricia submits the *2021 Umatilla County NHMP* to Oregon Emergency Management (OEM) and to the Federal Emergency Management Agency (FEMA) for review. They agree to review the NHMP concurrently.
April 26, 2021	Joseph Murray of OEM emails Tricia with comments and suggestions for the *2021 Umatilla County NHMP*. Joseph states these are suggestions and does not require these changes be made. FEMA confirms they are doing a concurrent review of the NHMP but does not yet have comments.
May 11, 2021	Tricia receives the FEMA comments on the draft *2021 Umatilla County NHMP* from Edgar Gomez of FEMA. She shares these comments with Bob Waldher and Tom Roberts of Umatilla County.
May 25, 2021	A revised *2021 Umatilla County MJNHMP* is sent to FEMA and OEM with the updated FEMA Region 10 Review Tool.
June 7, 2021	The *2021 Umatilla County MJNHMP* receives the Approved Pending Adoption (APA) letter from FEMA. The letter is emailed from Joseph Murray at OEM to Tricia, Bob, and Tom on 6/7/21.
June 8, 2021	Tricia emails the Umatilla County NHMP Steering Committee with the news of the APA letter and includes the APA letter. Tricia requests that the plan holders obtain approval from their authorities; then send the approval resolutions to her. Example resolutions have been sent previously and will again be sent upon request.
June 16, 2021	The *2021 Umatilla County MJNHMP* is approved by Umatilla County Board of County Commissioners on June 16, 2021.
June-August, 2021	List all the jurisdictional (plan holder) approval dates: Umatilla County – Scheduled for Board of County Commissioners on 6/16/21, approved. Bob Waldher sent the signed resolution to Tricia via email on 6/16/21. Adams – Scheduled for City Council on 6/14/21, approved. Donna Grimes, City Recorder, sent the resolution via email on 6/18/21. Athena – Scheduled for City Council on 6/10/21, approved. Michelle Fox sent the signed resolution to Tricia via email on 6/14/21. Echo – Scheduled for City Council on 6/15/21, approved. Dave Slaght sent the signed resolution by email on 6/18/21. Helix – Scheduled for City Council on 6/21/21, approved. Carrie Bennett sent the signed resolution to Tricia via email on 6/27/21. Hermiston – Scheduled for City Council on 7/12/21, approved. Clinton Spencer sent the signed resolution by email on 7/13/21.

2021 Umatilla County MJNHMP List of Approvals

	Milton-Freewater – Scheduled for City Council on 7/12/21, approved. Leanne Steadman, City Recorder, sent the resolution via email on 7/13/21. Pendleton – Scheduled for City Council on 6/15/21, approved. Donna Biggerstaff, Deputy City Recorder, sent the signed resolution to Tricia via email on 7/7/21. Pilot Rock – Scheduled for City Council on 7/6/21 and rescheduled to 7/20/21. Rescheduled again to 8/3/21. Tricia received the approval resolution from Teri Bacus via email on 8/4/21. Stanfield – Scheduled for City Council on 7/20/21, approved. Tricia received the approval resolution from Benjamin Burgener on 7/22/21. Ukiah – Scheduled for City Council on 7/6/21, approved. Donna Neumann sent the signed resolution via email on 7/5/21. Umatilla – Scheduled for City Council on 7/6/21, approved. Jacob Foutz sent the signed resolution to Tricia via email on 7/15/21. Weston – Scheduled for City Council on 6/9/21, approved. Shelia Jasperson sent Tricia the signed resolution via email on 6/10/21. Stanfield Irrigation District – Scheduled for the Board on 7/14/21, approved. Signed resolution from Tiffany Harrell received via email on 7/20/21. Hermiston Irrigation District – Scheduled for the Board on 6/10/21, approved. Resolution received from Annette Kirkpatrick via email 6/14/21. Walla Walla River Irrigation District – Scheduled for the Board on 6/10/21. Resheduled for Board meeting on 7/8/21, approved. Teresa sent Tricia the signed resolution via email on 7/9/21. Umatilla County Soil and Water Conservation District – Scheduled for the Board on 6/15/21, approved. Received the signed resolution from Kyle Waggoner on 6/29/21.
August 4, 2021	Tricia sends the resolutions of approval from Umatilla County et al (see list) to OEM and FEMA.
August 19, 2021	Joseph Murray at OEM emails Tricia, Bob, and Tom the *2021 Umatilla County MJNHMP* approval letter, dated 8/17/21, from FEMA. The dates of approval for the NHMP are from August 12, 2021 to August 11, 2026.

2021 Umatilla County MJNHMP List of Approvals

FEMA Approval Letter

U.S. Department of Homeland Security
FEMA Region 10
130 228th Street, SW
Bothell, WA 98021-8627

FEMA

August 17, 2021

The Honorable George L. Murdock
Chair, Umatilla County Commissioners
216 SE 4th St.
Pendleton, OR 97801

Dear Chair Murdock:

On August 12, 2021, the United States Department of Homeland Security's Federal Emergency Management Agency (FEMA) Region 10, approved the Umatilla County Hazard Mitigation Plan as a multi-jurisdictional local plan as outlined in Code of Federal Regulations Title 44 Part 201. This approval provides the below jurisdictions eligibility to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's, Hazard Mitigation Assistance grants projects through August 11, 2026, through your state:

Umatilla County	City of Adams	City of Athena
City of Echo	City of Helix	City of Hermiston
City of Milton-Freewater	City of Pendleton	City of Pilot Rock
City of Stanfield	City of Ukiah	City of Umatilla
City of Weston	Stanfield Irrigation District	Hermiston Irrigation
	Umatilla Soil and Water Conservation District	Walla Walla River Irrigation District

FEMA individually evaluates all application requests for funding according to the specific eligibility requirements of the applicable program. Though a specific mitigation activity or project identified in the plan may meet the eligibility requirements, it may not automatically receive approval for FEMA funding under any of the programs.

Approved mitigation plans may be eligible for points under the National Flood Insurance Program's Community Rating System. For additional information regarding the CRS, please visit: www.fema.gov/national-flood-insurance-program-community-rating-system or contact your local floodplain manager.

Over the next five years, we encourage your communities to follow the plan's schedule for monitoring and updating, and to develop further mitigation actions. To continue eligibility, jurisdictions must review, revise as appropriate, and resubmit the plan within five years of the original approval date.

2021 Umatilla County MJNHMP List of Approvals

Emergency Management Agency, Region X officials to enable final approval of the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan.*

PASSED by the Common Council this 12th day of July, 2021.
SIGNED by the Mayor this 12th day of July, 2021.

Dr. David Drotzmann, MAYOR

ATTEST:

Lilly Alarcon-Strong, CMC, CITY RECORDER

2021 Umatilla County MJNHMP List of Approvals

FEMA Region 10 Local Review Tool

LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: Umatilla County	**Title of Plan:** 2021 Umatilla County Multi-Jurisdictional NHMP	**Date of Plan:** March 31, 2021
Local Point of Contact: Bob (Robert) Waldher, Tom (Thomas) Roberts	**Address:** Robert Waldher, Planning Director Umatilla County Department of Land Use Planning 216 SE 4th St. Pendleton, OR 97801 Thomas Roberts, Emergency Manager Umatilla County Sheriff's Office 4700 NW Pioneer Place Pendleton, OR 97801	
Title: Planning Director, Emergency Manager		
Agency: Umatilla County		
Phone Number: Bob Waldher 541-278-6251, Tom Roberts 541-969-0270	**E-Mail:** robert.waldher@umatillacounty.net thomas.roberts@umatillacounty.net	

State Reviewer:	**Title:**	**Date:**
Joseph A. Murray	Planner	April 26,2021

FEMA Reviewer:	**Title:**	**Date:**
Edgar Gomez	Community Planner	June 7, 2021
Date Received in FEMA Region 10	4/1/2021	
Plan Not Approved		
Plan Approvable Pending Adoption	6/7/2021	
Plan Approved	8/12/2021	

2021 Umatilla County MJNHMP List of Approvals

SECTION 1:
REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST	Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)			
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Volume I, pages, i-iv; Volume I, Section 1, pages. 3-4; Volume I, Section 2, pages 3-4; Volume III, Appendix A, pages 1-79	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Volume I, pages. ii-iv; Volume I, Section 1, pages 3-4; Volume III, Appendix A, pages 8-11	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Volume I, Section 1, page 4; Volume III, Appendix A, pages 1-79	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	References included throughout the plan; Volume III, Appendix F, pages 1-19	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Volume I, Section 4, pages 7-8	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a five-year cycle)? (Requirement §201.6(c)(4)(i))	Volume I, Section 4, pages 1-2, 6-9; Volume III, Appendix H, pages 1-3	X	
ELEMENT A: REQUIRED REVISIONS			
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Volume I, Section 2, pages 1-47; Volume II, pages. ii-v; Volume II, Flood, pages 1-33; Volume II, Air Quality, pages 1-31; Volume II, Severe Weather, pages 1-19;	X	

	Volume. II, Wildfire, pages 1-39; Volume II, Drought, pages 1-21; Volume II, Earthquake, pages 1-23; Volume II, Volcanoes, pages 1-17; Volume II, Landslide, pages 1-14		
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Volume I, Section 2, pages 1-47; Volume II, pages. ii-v; Volume II, Flood, pages 1-33; Volume II, Air Quality, pages 1-31; Volume II, Severe Weather, pages 1-19; Volume II, Wildfire, pages 1-39; Volume II, Drought, pages 1-21; Volume II, Earthquake, pages 1-23; Volume II, Volcanoes, pages 1-17; Volume II, Landslide, pages 1-14	X	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Volume I, Section 2, pages 1-47; Volume II, pages. ii-v; Volume II, Flood, pages 1-33; Volume II, Air Quality, pages 1-31; Volume II, Severe Weather, pages 1-19; Volume II, Wildfire, pages 1-39; Volume II, Drought, pages 1-21; Volume II, Earthquake, pages 1-23; Volume II, Volcanoes, pages 1-17; Volume II, Landslide, pages 1-14	X	
B4. Does the Plan address (National Flood Insurance Program (NFIP) insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Volume I, Section 2, page 28; Volume II, Flood, page 13	X	
ELEMENT B: REQUIRED REVISIONS			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Volume I, Section 3, page 2; Volume I, Section 4, pages 3-5; Volume III, Appendix A, page 4; Volume III, Appendix B, pages 43-62	X	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Volume I, Section 2, pages 27-28; Volume II, Flood, pages 14-15, 23-25; Volume III, Appendix A, page 4	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Volume I, Section 3, page 2; Volume I, Section 1, page 6;	X	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Volume I, Section 3, pages 7-23	X	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Volume I, Section 3, pages. 4-23; Volume III, Appendix C, pages 1-8; Volume III, Appendix D, pages 1-10	X	

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Volume I, Section 4, pages 2-5; Volume III, Appendix A, page 4	X	
ELEMENT C: REQUIRED REVISIONS			
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Volume I, Section 2, pages 4-5, 25-27; Volume III, Appendix B, pages 21-42; Volume III, Appendix E, pages 1-49	X	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Volume I, Section 3, pages. 7-23, 25-38; Volume III, Appendix G, pages 1-3	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Volume I, Section 2, pages 4, 22; Volume I, Section 3, pages 1-2, 7-23; Volume II, page v; Volume III, Appendix A, pages 2-3	X	
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Volume I, Section 4, pages 1-2	X	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Volume I, Section 4, pages 1-2	X	
ELEMENT E: REQUIRED REVISIONS			
OPTIONAL: HIGH HAZARD POTENTIAL DAM (HHPD) RISKS			
HHPD1. Did Element A4 (planning process) describe the incorporation of existing plans, studies, reports, and technical information for high hazard potential dams?			
HHPD2. Did Element B3 (risk assessment) address HHPDs?			
HHPD3. Did Element C3 (mitigation goals) include mitigation goals to reduce long-term vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public?			
HHPD4. Did Element C4-C5 (mitigation actions) address HHPDs prioritize mitigation actions to reduce vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public?			
REQUIRED REVISIONS			

ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			

SECTION 2:
PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

Plan Strengths

- A diverse variety of stakeholders from and around the planning area participated in the planning process. Stakeholder participation is important to the planning process as valuable insight and support comes from such organizations.
- There is extensive documentation of the meetings, notices, and attendance to support the planning process narrative of the mitigation plan.

Opportunities for Improvement

- Rather than breaking up the planning process narratives into different sections, create one section that discusses the planning process, who participated, and how participation was completed for a fluent section. Use appendices for supporting documentation.
- In the next plan update, develop a plan to encourage more public participation in the planning process. The use of surveys, posting of meetings to encourage participation in the meeting, and offering multiple meeting times are all examples of ways to include the public.

Element B: Hazard Identification and Risk Assessment

Plan Strengths

- The incorporation of climate change data, studies, and relevant information in the applicable hazard profiles are strong narratives to include.
- Pictures from the planning area's hazard events are included in the hazard profile annexes. This is a great way to show the severity of past events.
- The vulnerability assessment for each hazard profile is extremely thorough.

Opportunities for Improvement

- A recommendation for the county and its jurisdictions is to profile dam failure as its own separate section in the risk assessment as there are 9 dams located in the planning area.
- Develop separate hazard profile annexes for severe summer storms and severe winter storms. The two hazards can have different impacts on the planning area.

Element C: Mitigation Strategy

Plan Strengths

- Narrative columns are included in the mitigation action to identify how the previous actions may have changed from the previous plan.
- The mitigation strategy includes actions and projects that are specific to the hazards identified in the risk assessment. Including hazard-specific actions to address vulnerabilities is a best practice.

Opportunities for Improvement

- Considering going beyond regulatory capabilities for each jurisdiction and identify the administrative/technical and financial capabilities that each community or special district currently has.
- If any actions are added to the mitigation strategy after the plan's final approval, they must meet the criteria outlined in the Elements C4 and C5.
- Although the mitigation action rankings tie in with the risk assessment, it is recommended that the prioritization ranking method go beyond the hazard rankings. There could be different actions that are classified as a high priority due to the low cost in implementation or the increase in community resiliency a completed action could have on the planning area.
- Include specific cost estimates for each mitigation action. This will help the jurisdiction(s) gauge how much of local funds could be used to complete the mitigation actions.

Element D: Plan Update, Evaluation, and Implementation (*Plan Updates Only*)

Plan Strengths

- There is an appendix dedicated to completed mitigation action success stories. This shows the planning area's commitment to furthering hazard mitigation.
- The plan identifies the previous plan's goals and how they correlate with the update's goals. Additionally, the plan identifies new hazards that have been added. Both support Element D3.

Opportunities for Improvement

- Use the most recent available data for the community profile for all topics that are discussed in the section.
- Consider including a section that addresses vacant versus occupied housing. Vacant properties are more likely to increase a community's vulnerability to hazard impacts.

B. Resources for Implementing Your Approved Plan

FEMA **Mitigation Planning and the Community Rating System** Key Topics Bulletin supports communities who participate in the National Flood Insurance Program's CRS Program, or who would like to, and updating a Natural Hazard Mitigation Plan. You can reach this information at https://www.fema.gov/media-library/assets/documents/171290.

The **Region 10 Integrating Natural Hazard Mitigation into Comprehensive Planning** is a resource specific to Region 10 states and provides examples of how communities are integrating natural hazard mitigation strategies into comprehensive planning. You can find it in the FEMA Library at http://www.fema.gov/media-library/assets/documents/89725.

The **Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials** resource provides practical guidance on how to incorporate risk reduction strategies into existing local plans, policies, codes, and programs that guide community development or redevelopment patterns. It includes recommended steps and tools to assist with local integration efforts, along with ideas for overcoming possible impediments, and presents a series of case studies to demonstrate successful integration in practice. You can find it in the FEMA Library at http://www.fema.gov/library/viewRecord.do?id=7130.

The **Mitigation Ideas: A Resource for Reducing Risk from Natural Hazards** resource presents ideas for how to mitigate the impacts of different natural hazards, from drought and sea level rise, to severe winter weather and wildfire. The document also includes ideas for actions that communities can take to reduce risk to multiple hazards, such as incorporating a hazard risk assessment into the local development review process. You can find it in the FEMA Library at http://www.fema.gov/library/viewRecord.do?id=6938.

The **Local Mitigation Planning Handbook** provides guidance to local governments on developing or updating hazard mitigation plans to meet and go above the requirements. You can find it in the FEMA Library at http://www.fema.gov/library/viewRecord.do?id=7209.

The **Integration Hazard Mitigation and Climate Adaptation Planning: Case Studies and Lessons Learned** resource is a 2014 ICLEI publication for San Diego with a clear methodology that could assist in next steps for integration impacts of climate change throughout mitigation actions. http://icleiusa.org/wp-content/uploads/2015/08/Integrating-Hazard-Mitigation-and-Climate-Adaptation-Planning.pdf

The **Local Mitigation Plan Review Guide and Tool** resource is available through FEMA's Library and should be referred to for the next plan update. http://www.fema.gov/library/viewRecord.do?id=4859

The **Tribal Multi-Hazard Mitigation Planning Guidance:** This resource is specific to tribal governments developing or updating tribal mitigation plans. It covers all aspects of tribal planning requirements and the steps to developing tribal mitigation plans. You can find the document in the FEMA Library at http://www.fema.gov/media-library/assets/documents/18355

Volcanic Eruption Mitigation Measures: For information on Mitigation Actions for Volcanic Eruptions that would satisfy the C4 requirement, please visit: http://earthzine.org/2011/03/21/volcanic-crisis-management-and-mitigation-strategies-a-multi-risk-framework-case-study/ and http://www.gvess.org/publ.html.

The FEMA Region 10 **Risk Mapping, Analysis, and Planning program (Risk MAP)** releases a monthly newsletter that includes information about upcoming events and training opportunities, as well as hazard and risk related news from around the Region. Past newsletters can be viewed at http://www.starr-team.com/starr/RegionalWorkspaces/RegionX/Pages/default.aspx. If you would like to receive future newsletters, email rxnewsletter@starr-team.com and ask to be included.

The mitigation strategy may include eligible projects to be funded through FEMA's hazard mitigation grant programs Building Resilient Infrastructure and Communities (BRIC), Hazard Mitigation Grant Program, and Flood Mitigation Assistance). Contact your State Hazard Mitigation Officer, Amie Bashant at amie.bashant@mil.state.or.us, for more information.

2021 Umatilla County MJNHMP List of Approvals

SECTION 3:
MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

	Mulit-Juridiction Summary Sheet						Requirements: (Met /Not Met)					
Line Number	Jurisdiction Name	Jurisdiction Type (city/borough/township/village, etc.)	Plan Point of Contact	Mailing Address	Email	Phone	A. Planning Process	B. Hazard Identification and Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation and Implementation	E. Plan Adoption	F. State Requirements
1	Pendleton	City	George Cress				Y	Y	Y	Y	Y	
2	Milton-Freewater	City	Shane Garner				Y	Y	Y	Y	Y	
3	Hermiston	City	Clinton Spencer				Y	Y	Y	Y	Y	
4	Athena	City	Michelle Fox				Y	Y	Y	Y	Y	
5	Weston	City	Duane Thul				Y	Y	Y	Y	Y	
6	Ukiah	City	Donna Neuman n				Y	Y	Y	Y	Y	
7	Echo	City	Dave Slaght				Y	Y	Y	Y	Y	
8	Stanfield	City	Benjami n Burgener				Y	Y	Y	Y	Y	

9	Umatilla	City	Brandon Seitz				Y	Y	Y	Y	Y	
10	Adams	City	Graham Alderson				Y	Y	Y	Y	Y	
11	Helix	City	Carrie Bennet and Josh Smith				Y	Y	Y	Y	Y	
12	Pilot Rock	City	Teri Bacus				Y	Y	Y	Y	Y	
13	Walla Walla River Irrigation District	Special District	Teresa Kilmer				Y	Y	Y	Y	Y	
14	Stanfield Irrigation District	Special District	Ray Kopacz				Y	Y	Y	Y	Y	
15	Umatilla County Soil and Water Conservation District	Special District	Kyle Waggoner				Y	Y	Y	Y	Y	
16	Hermiston Irrigation District	Special District	Annette Kirkpatrick				Y	Y	Y	Y	Y	
17	Umatilla County	County	Robert Waldher				Y	Y	Y	Y	Y	

2021 Umatilla County MJNHMP List of Approvals

FEMA Approved Pending Adoption Letter

U.S. Department of Homeland Security
FEMA Region 10
130 228th Street, SW
Bothell, WA 98021-8627

FEMA

June 7, 2021

Ms. Amie Bashant
State Hazard Mitigation Officer
Oregon Military Department
Office of Emergency Management
P.O. Box 14370
Salem, Oregon 97309

Dear Ms. Bashant:

The Federal Emergency Management Agency (FEMA) Region 10 completed a pre-adoption review of the draft *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*. The attached Mitigation Plan Review Tool documents the Region's review and compliance with all required elements of 44 CFR Part 201.6, as well as identifies the jurisdiction participating in the planning process. This letter serves as Region 10's commitment to approve the plan upon receiving documentation of its adoption by the participating jurisdiction.

Formal adoption documentation must be submitted to FEMA Region 10 by at least one jurisdiction within one calendar year of the date of this letter, or the entire plan must be updated and resubmitted for review. Once FEMA approves the plan, the jurisdiction is eligible to apply for FEMA Hazard Mitigation Assistance grants.

Please contact Kyle McCormick, *acting* Regional Mitigation Planning Program Manager, at (202) 856-2030 or kyle.mccormick@fema.dhs.gov with any questions.

Sincerely,

JOHN D SCHELLING
Digitally signed by JOHN D SCHELLING
Date: 2021.06.07 10:54:43 -07'00'

John D. Schelling
Risk Analysis Branch Chief
Mitigation Division

Attachment

EG:v1

2021 Umatilla County MJNHMP List of Approvals

Umatilla County Approval Resolution

THE BOARD OF COMMISSIONERS OF UMATILLA COUNTY

STATE OF OREGON

In the Matter of Adoption of Revised Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan	))))	Order No. BCC2021-060

WHEREAS on June 30, 2009, by Order No. BCC2009-042, the Board of Commissioners adopted the Umatilla County Natural Hazards Mitigation Plan, and the plan was last updated and approved in February 2014, by Order BCC2014-031;

WHEREAS Umatilla County recognizes the threat that natural hazards pose to people, property and infrastructure within our community;

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences;

WHEREAS an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs;

WHEREAS, Umatilla County has fully participated in the FEMA prescribed mitigation planning process to prepare the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities;

WHEREAS, Umatilla County has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of the impacts of future disasters within the Umatilla County Multi-Jurisdictional Natural Hazard Mitigation Plan;

WHEREAS these proposed projects and programs have been incorporated into the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan that has been prepared and promulgated for consideration and implementation by Umatilla County;

2021 Umatilla County MJNHMP List of Approvals

WHEREAS, the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the Umatilla County, Multi-Jurisdictional Natural Hazards Mitigation Plan and pre-approved it on June 7, 2021, contingent upon official adoption of the participating governments and entities;

WHEREAS, the National Hazard Mitigation Plan is comprised of three volumes: Volume I - Basic Mitigation Plan, Volume II - Hazard Annexes, Volume III - Mitigation Resources;

WHEREAS, the National Hazard Mitigation Plan is in an on-going cycle of development and revision to improve its effectiveness.

NOW THEREFORE, the Board of Commissioners orders that:

1. The Board of Commissioners adopts the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan, a copy of which is attached to this order and incorporated by this reference, as an official plan for Umatilla County.

2. Umatilla County will submit this order to the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials, for final approval of the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan.

DATED this 16th day of June, 2021.

UMATILLA COUNTY BOARD OF COMMISSIONERS

George L. Murdock, Chair

John M. Shafer, Commissioner

ABSENT

Daniel N. Dorran, Commissioner

BOARD OF COMMISSIONERS UMATILLA COUNTY STATE OF OREGON

ATTEST:
OFFICE OF COUNTY RECORDS

Records Officer

2021 Umatilla County MJNHMP List of Approvals

City of Adams Approval Resolution

RESOLUTION NO. 21-12

A RESOLUTION OF THE CITY OF ADAMS, UMATILLA COUNTY, OREGON, IN THE MATTER OF ADOPTING THE CITY OF ADAMS REPRESENTATION IN THE UPDATES TO THE UMATILLA COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN

WHEREAS, The City of Adams recognizes the threat that natural hazards pose to people, property, and infrastructure within our City; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people, property, and infrastructure from future hazard occurrences; and

WHEREAS, an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS, the City of Adams has fully participated in the FEMA prescribed mitigation planning process to prepare the Umatilla County Natural Hazards Mitigation Plan, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

WHEREAS, Umatilla County has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of Umatilla County to the impacts of future disasters within the Umatilla County Multi-Jurisdictional Natural Hazard Mitigation Plan; and

WHEREAS, these proposed projects and programs have been incorporated into the Umatilla County Jurisdictional Natural Hazard Mitigation Plan that has been prepared and promulgated for consideration and implementation by the cities and towns of Umatilla County; and

WHEREAS, the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region 10 officials have reviewed the Umatilla County, Multi-Jurisdictional Natural Hazards Mitigation Plan and pre-approved it (in a letter dated June 7, 2021 and added as appendix A to this resolution) contingent upon this official adoption of the participating governments and entities; and

WHEREAS, the NHMP is comprised of three volumes: Volume I-Basic Mitigation Plan, Volume II-Hazard Annexes, Volume III-Mitigation Resources, collectively referred to herein as the NHMP; and

WHEREAS, the NHMP is in an ongoing cycle of development and revision to improve its effectiveness; and

NOW, THEREFORE, BE IT RESOLVED BY THE COMMON COUNCIL OF THE CITY OF ADAMS, OREGON:

That the City of Adams adopts the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan as an official plan; and directs staff to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

BE IT FURTHER RESOLVED that the City of Adams will send the Adoption resolution to the Oregon Military Department's Office of Emergency Management and Federal Emergency

2021 Umatilla County MJNHMP List of Approvals

Management Agency, Region 10 officials to enable final approval of the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation.

APPROVED and ADOPTED by the City of Adams City Council the 14th day of June 2021.

City of Adams

BY: _____
Mayor Pro Tem

ATTESTED TO BY: _____
City Recorder

2021 Umatilla County MJNHMP List of Approvals

U.S. Department of Homeland Security
FEMA Region 10
130 228th Street, SW
Bothell, WA 98021-8627

Appendix A

FEMA

June 7, 2021

Ms. Amie Bashant
State Hazard Mitigation Officer
Oregon Military Department
Office of Emergency Management
P.O. Box 14370
Salem, Oregon 97309

Dear Ms. Bashant:

The Federal Emergency Management Agency (FEMA) Region 10 completed a pre-adoption review of the draft *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*. The attached Mitigation Plan Review Tool documents the Region's review and compliance with all required elements of 44 CFR Part 201.6, as well as identifies the jurisdiction participating in the planning process. This letter serves as Region 10's commitment to approve the plan upon receiving documentation of its adoption by the participating jurisdiction.

Formal adoption documentation must be submitted to FEMA Region 10 by at least one jurisdiction within one calendar year of the date of this letter, or the entire plan must be updated and resubmitted for review. Once FEMA approves the plan, the jurisdiction is eligible to apply for FEMA Hazard Mitigation Assistance grants.

Please contact Kyle McCormick, *acting* Regional Mitigation Planning Program Manager, at (202) 856-2030 or kyle.mccormick@fema.dhs.gov with any questions.

Sincerely,

JOHN D SCHELLING
Digitally signed by JOHN D SCHELLING
Date: 2021.06.07 10:54:43 -07'00'

John D. Schelling
Risk Analysis Branch Chief
Mitigation Division

Attachment

EG:v1

2021 Umatilla County MJNHMP List of Approvals

City of Athena Approval Resolution

CITY OF ATHENA, OREGON

Resolution Number: 2021-07

A Resolution Adopting the City of Athena's Representation in the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan

Whereas, the City of Athena recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

Whereas, an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, the City of Athena has fully participated in the FEMA prescribed mitigation planning process to prepare the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

Whereas, the City of Athena has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of the City of Athena to the impacts of future disasters within the *Umatilla County Multi-Jurisdictional Natural Hazard Mitigation Plan*; and

Whereas, these proposed projects and programs have been incorporated into the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* that has been prepared and promulgated for consideration and implementation by the cities of Umatilla County; and

Whereas, the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the *Umatilla County, Multi-Jurisdictional Natural Hazards Mitigation Plan* and pre-approved it (dated: June 7, 2021) contingent upon this official adoption of the participating governments and entities;

Whereas, the NHMP is comprised of four volumes: Volume I - Basic Mitigation Plan, Volume II – Hazard Annexes, Volume III – City/Special District Addendums, and Volume IV – Mitigation Resources, collectively referred to herein as the NHMP; and

Whereas, the NHMP is in an on-going cycle of development and revision to improve its effectiveness; and

Whereas, City of Athena adopts the NHMP and directs the staff to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

Now, therefore, be it resolved, that the City of Athena adopts *the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* as an official plan; and

Be it further resolved, that the City of Athena will submit this Adoption Resolution to the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials to enable final approval of the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan.*

Adopted by the City Council of Athena this 10th day of June, 2021.

Becky Schroeder, Mayor

Attested Michelle Fox, City Recorder

2021 Umatilla County MJNHMP List of Approvals

City of Echo Approval Resolution

RESOLUTION 487 - 2021

A Resolution Adopting the City of Echo Representation in the Updates to the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan

Whereas, the City of Echo recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

Whereas, an adopted Natural Hazards Mitigation Plan (NHMP) is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, the City of Echo has fully participated in the FEMA prescribed mitigation planning process to prepare the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

Whereas, the City of Echo has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of the City of Echo to the impacts of future disasters within the *Umatilla County Multi-Jurisdictional Natural Hazard Mitigation Plan*; and

Whereas, these proposed projects and programs have been incorporated into the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* that has been prepared and promulgated for consideration and implementation by the cities of Umatilla County; and

Whereas, the Oregon Military Department's Office of Emergency Management (OEM) and Federal Emergency Management Agency (FEMA), Region X officials have reviewed the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* and pre-approved it _____contingent upon this official adoption of the participating governments and entities;

Whereas, the NHMP is comprised of three volumes: Volume I Basic Plan, Volume II – Hazard Annexes, Volume III –Mitigation Resources, collectively referred to herein as the NHMP; and

Whereas, the NHMP is in an on-going cycle of development and revision to improve its effectiveness; and

Whereas, City of Echo adopts the NHMP and directs the City Administrator to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

Now, therefore, be it resolved, that the City of Echo adopts *the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* as an official plan; and

2021 Umatilla County MJNHMP List of Approvals

Be it further resolved, that the City of Echo will submit this Adoption Resolution to the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials to enable final approval of the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan.*

Adopted this **15th** day of **June**, 2021

Mayor, Chad Ray

Attest:

David Slaght/ City Administrator

2021 Umatilla County MJNHMP List of Approvals

City of Helix Approval Resolutions

Resolution # 21-007

A Resolution Adopting Updates to the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan

Whereas, City of Helix recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

Whereas, an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, City of Helix has fully participated in the FEMA prescribed mitigation planning process to prepare the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

Whereas, City of Helix has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of the impacts of future disasters within the *Umatilla County Multi-Jurisdictional Natural Hazard Mitigation Plan*; and

Whereas, these proposed projects and programs have been incorporated into the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* that has been prepared and promulgated for consideration and implementation by City of Helix; and

Whereas, the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the *Umatilla County, Multi-Jurisdictional Natural Hazards Mitigation Plan* and pre-approved it (dated: June 7, 2021) contingent upon this official adoption of the participating governments and entities;

Whereas, the NHMP is comprised of three volumes: Volume I - Basic Mitigation Plan, Volume II – Hazard Annexes, Volume III – Mitigation Resources; and

Whereas, the NHMP is in an on-going cycle of development and revision to improve its effectiveness; and

Whereas, City of Helix adopts the NHMP and directs the city staff to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

Now, therefore, be it resolved, that City of Helix adopts *the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* as an official plan; and

Be it further resolved, that City of Helix will submit this Adoption Resolution to the Oregon Military Department's Office of Emergency Management and Federal

2021 Umatilla County MJNHMP List of Approvals

Emergency Management Agency, Region X officials to enable final approval of the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*.

Adopted this 21st day of June, 2021

Certifying Official

2021 Umatilla County MJNHMP List of Approvals

City of Hermiston Approval Resolution

RESOLUTION NO. 2192

Whereas, the City of Hermiston recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

Whereas, an adopted Natural Hazards Mitigation Plan (NHMP) is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, the City of Hermiston has fully participated in the FEMA prescribed mitigation planning process to prepare the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

Whereas, the City of Hermiston has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of the City to the impacts of future disasters within the *Umatilla County Multi-Jurisdictional Natural Hazard Mitigation Plan*; and

Whereas, these proposed projects and programs have been incorporated into the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* that has been prepared and promulgated for consideration and implementation by the cities of Umatilla County; and

Whereas, the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the Umatilla *County Multi-Jurisdictional Natural Hazards Mitigation Plan* and pre-approved it (dated: May 2021) contingent upon this official adoption of the participating governments and entities;

Whereas, the NHMP is comprised of four volumes: Volume I - Basic Mitigation Plan, Volume II – Hazard Annexes, Volume III – City/Special District Addendums, and Volume IV – Mitigation Resources, collectively referred to herein as the NHMP; and

Whereas, the NHMP is in an on-going cycle of development and revision to improve its effectiveness; and

Whereas, City of Hermiston adopts the NHMP and directs the city manager and staff to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

Now, therefore, be it resolved, that the City of Hermiston adopts the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* as an official document; and

Be it further resolved, that the City of Hermiston will submit this Adoption Resolution to the Oregon Military Department's Office of Emergency Management and Federal

2021 Umatilla County MJNHMP List of Approvals

Emergency Management Agency, Region X officials to enable final approval of the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan.*

PASSED by the Common Council this 12th day of July, 2021.
SIGNED by the Mayor this 12th day of July, 2021.

Dr. David Drotzmann, MAYOR

ATTEST:

Lilly Alarcon-Strong, CMC, CITY RECORDER

2021 Umatilla County MJNHMP List of Approvals

Executive Summary

Umatilla County developed and updated this *2021 Umatilla County Multi-jurisdictional Natural Hazards Mitigation Plan* (*2021 Umatilla County NHMP*) to prepare for and to mitigate the short- and long-term effects resulting from natural hazards. It is not possible to predict exactly when these hazards will occur, or the extent to which they will affect the community. However, with careful planning and collaboration among the whole community (https://www.fema.gov/whole-community) - public agencies at local, state and federal levels; private sector organizations; businesses; families and individuals; non-profit groups; schools and academia; media outlets; faith based and community organizations - a resilient community can be created that benefits from mitigation planning, including this *2021 Umatilla County NHMP,* and short- and long-term recovery planning efforts, which are described in other plans.

The Federal Emergency Management Agency (FEMA) defines mitigation as ". . . the effort to reduce loss of life and property by lessening the impact of disasters . . . through risk analysis, which results in information that provides a foundation for mitigation activities that reduce risk." Said another way, natural hazard mitigation is a method of reducing or alleviating the impacts to life, property, and the environment resulting from natural hazards through short- and long-term strategies. Example strategies include policy changes, such as updated ordinances, and projects, such as seismic retrofits to critical facilities; and education and outreach to targeted audiences, such as Spanish speaking residents or the elderly. Natural hazard mitigation is the responsibility of the whole community.

> *44 CFR 201.6 – The local mitigation plan is the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. . . .*

Why Develop this Mitigation Plan?

In addition to establishing a comprehensive community-level mitigation strategy, the Disaster Mitigation Act of 2000 (DMA2K) and the regulations contained in 44 CFR 201 require that jurisdictions maintain an approved NHMP to receive federal funds for mitigation projects. Local and federal approval of this plan ensures that Umatilla County, the twelve cities, and the four special districts (identified as plan holders and all listed below) will remain eligible for pre- and post-disaster mitigation grants.

> *44 CFR 201.6(a)(1) – A local government must have a mitigation plan approved pursuant to this section in order to receive HMGP project grants . . .*

Who Participated in Developing the Plan?

The Oregon Department of Land Development and Conservation (DLCD) led the Umatilla County NHMP Steering Committee through the NHMP update process. Umatilla County, the twelve incorporated cities, and four special districts (identified as plan holders because they have signed IGAs with DLCD) collaborated with many others to update to the expired *2014 Umatilla County*

2021 Umatilla County MJNHMP List of Approvals

NHMP. This *2021 Umatilla County NHMP* is the result of a substantial collaborative effort between DLCD, Umatilla County, and all participating organizations (plan holders and others). Partners are plan holders are those organizations or jurisdictions that signed IGAs with DLCD for the work on the NHMP. These plan holders are listed in the bullet points below. Other partner organizations include: Federal Emergency Management Agency, Oregon Office of Emergency Management, Oregon Climate Change Research Institute, National Weather Service, USDA-Umatilla National Forest, Oregon Department of Forestry, Clearview Disability Resource Center, Confederated Tribes of the Umatilla Indian Reservation, U.S. Army Corps of Engineers, Greater Easter Oregon Development Corporation, Oregon Energy Trust, Umatilla County Fire District #1, East Umatilla Fire & Rescue District, Walla Walla Basin Watershed District, and the Milton-Freewater Water Control District.

The Umatilla County NHMP Steering Committee includes these partner plan holder organizations:

- Umatilla County
- City of Adams
- City of Athena
- City of Echo
- City of Helix
- City of Hermiston
- City of Milton-Freewater
- City of Pendleton
- City of Pilot Rock
- City of Stanfield
- City of Ukiah
- City of Umatilla
- City of Weston
- Hermiston Irrigation District
- Stanfield Irrigation District
- Umatilla County Soil and Water Conservation District
- Walla Walla River Irrigation District

44 CFR 201.6(c)(1) – Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

See the Acknowledgements section for the full list of organizations and representatives that participated on the NHMP Steering Committee.

In collaboration with DLCD, the Umatilla County Planning Director and the Emergency Manager convened the planning process. The Umatilla County Planning Director and the Emergency Manager (or their perspective delegates) will take the lead in implementing, maintaining, and updating the NHMP. Umatilla County is dedicated to directly involving the public in the continual review and update of the NHMP. The County will post the *2021 Umatilla County Multi-jurisdictional Natural Hazards Mitigation Plan* on the County's website. The Cities and Special Districts will also post the NHMP on their websites.

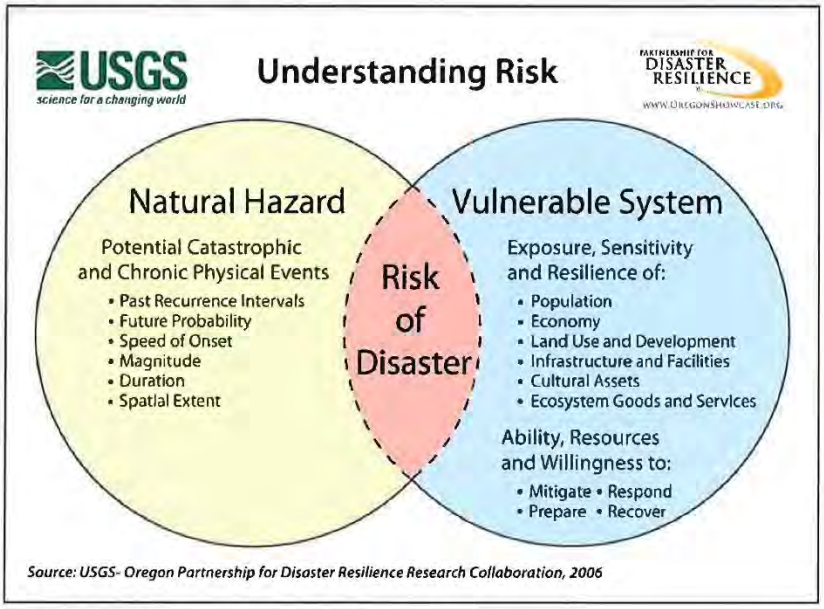
This NHMP was developed through a partnership funded by FEMA's Hazard Mitigation Grant Program (HMGP). In 2020, DLCD applied for and received funding under HMGP funds available due to DR-4432 from FEMA through Oregon's Office of Emergency Management (OEM).

How Does this Mitigation Plan Reduce Risk?

44 CFR 201.6(c)(2) – A Risk Assessment that provides the factual basis for activities proposed in the strategy

The NHMP is intended to assist Umatilla County to reduce the risk from natural hazards by identifying resources, information, and strategies for risk reduction. It will also help guide and coordinate mitigation activities throughout Umatilla County. A key part of the NHMP is the risk assessment. It consists of three phases: hazard identification, vulnerability assessment, and risk analysis. In Figure ES-1, the identification of natural hazards that could impact the community (natural hazard) and the exposure, sensitivity, and resilience of community (vulnerable system) overlap to create the risk of disaster. Recognizing and understanding these three phases is a key to natural hazard mitigation planning.

Figure ES-1 Understanding Risk



Source: USGS and Oregon Partnership for Disaster Resilience, 2006.

By identifying and understanding the relationship between natural hazards, vulnerable systems, and existing capacity, Umatilla County is better equipped to identify and implement actions aimed at reducing the overall risk to natural hazards. Volume I Section 2 Risk Assessment and Volume II Hazard Annexes provide details on the natural hazards in Umatilla County, the Cities, and the Special Districts, as well as the vulnerabilities and risks. Mitigation actions are identified to help reduce risk; see Section 3 Mitigation Strategy for details on mitigation actions.

2021 Umatilla County MJNHMP List of Approvals

What is the County's Overall Risk to Hazards?

Umatilla County, along with the Cities, the Special Districts, and other partners, reviewed and updated their risk assessment to evaluate the probability of each natural hazard as well as the vulnerability of the community to that hazard. All the previously identified natural hazards were retained for this NHMP. One new natural hazard, air quality, was added during the Hazard Vulnerability Assessment (HVA). The NHMP Steering Committee performed the HVA at the September 29, 2020 meeting. It was discussed again at the October 27, 2020 meeting. Table ES-1 summarizes the risk score and risk level for each hazard as determined by the Umatilla County NHMP Steering Committee. See also Volume I Section 2 Risk Assessment and Volume II Hazard Annexes for additional hazard information.

Table ES-1 Natural Hazards, Risk Scores, and Risk Levels for Umatilla County

HAZARD	RISK SCORE	RISK LEVEL (H-M-L)
Floods	240	High
Air Quality	224	High
Severe Summer Storm	223	High
Severe Winter Storm	220	High
Wildfire	203	High
Drought	184	Medium
Earthquakes	151	Medium
Volcano	127	Medium
Landslides/Debris Flows	85	Low

Source: DLCD Natural Hazards Planner, Tricia Sears, and the Umatilla County NHMP Steering Committee, 2020.

What is the Plan's Mission?

The mission of Umatilla County's NHMP was updated from the *2014 Umatilla County NHMP* for the *2021 Umatilla County NHMP*.

Mission:

To prevent loss and protect life, property, and the environment from natural hazards through coordination and cooperation among public and private partners. To mitigate the impacts of natural hazards and to increase the resilience of our community in our efforts to protect life, property, and the environment.

2021 Umatilla County MJNHMP List of Approvals

What are the Plan Goals?

44 CFR 201.6(c)(3)(i) – A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

The plan goals describe the overall direction that the participating jurisdiction's agencies, organizations, and citizens can take toward mitigating risk from natural hazards. The Umatilla County NHMP Steering Committee retained the goals as is from the *2014 Umatilla County NHMP* for the *2021 Umatilla County NHMP*.

Goal 1: Protect life and property.

Goal 2: Public outreach.

Goal 3: Planned prevention.

Goal 4: Agency/citizen coordination.

Goal 5: Natural resource protection.

Goal 6: Emergency service planning.

How are the Mitigation Actions Organized?

44 CFR 201.6(c)(3)(ii) – A section that identifies and analyzes a comprehensive range of specific mitigation actions . . .

The mitigation actions are organized within a Mitigation Actions Table included within Section 3 Mitigation Strategy. Full descriptions of each mitigation action are provided in Appendix A Mitigation Action Forms. The Steering Committee agreed to use the risk level scores and rankings from the Hazard Vulnerability Assessment (HVA) - shown in summary in Table ES-1 - as a way to prioritize the mitigation actions. As a result of this, the high priority actions are all of the multi-hazard (MH) actions and the hazard-specific actions for floods, air quality, severe summer storms, severe winter storms, and wildfire. Floods and air quality are the two hazards with the highest risk scores, with floods obtaining 240 out of 240 points. Drought, earthquakes, and volcanoes have a risk level of medium and thus the mitigation actions are medium. Landslides/debris flows are low risk level and thus are low priority mitigation actions. Data collection, research, Steering Committee discussion, and the public participation process resulted in the development of the mitigation actions.

The 2021 Umatilla County NHMP Mitigation Actions is Table 3-1 and the Umatilla County Mitigation Actions 2014 Status is Table 3-2; both are in the Section 3 Mitigation Strategy.

The mitigation actions portray the overall plan framework and identify links between the plan goals and actions. Tables 3-1 and 3-2 document the title of each action along with the coordinating organization, timeline, and the plan goals addressed. Each participating jurisdiction is identified.

There are **80 total mitigation actions** in the *2021 Umatilla County NHMP*. By natural hazard, the totals are as follows: multi-hazard (MH) = 24; drought (DR) = 3; earthquake (EQ) = 2; flood (FL) = 23; severe summer storms and severe winter storms (SS) = 7; wildfire (WF) = 10; volcanoes (VO) = 1, landslides/debris flows (LS) = 2, and air quality (AQ) = 8 (new in 2020).

The mitigation actions include both short and long-term activities. Each action includes an estimate of the timeline for implementation.

- *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to two years.
- *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement.
- *Ongoing action items* are activities that are currently being performed and will continue into the foreseeable future.

How will the plan be implemented?

44 CFR 201.6(c)(3)(iii) – An action plan describing how the actions . . . will be prioritized, implemented and administered . . .

44 CFR 201.6(c)(4) – A plan maintenance process . . .

Section 4 Plan Implementation and Maintenance details the formal process that will ensure that the *2021 Umatilla County NHMP* remains an active and relevant document. The plan will be implemented, maintained and updated by a designated convener. The Umatilla County Planning Director and the Emergency Manager are the designated conveners and are responsible for overseeing the review and implementation processes. The plan maintenance process includes a schedule for monitoring and evaluating the plan twice per year and updating the NHMP every five years to maintain eligibility for pre- and post-disaster funds from FEMA. This section of the NHMP describes how the communities will integrate public participation throughout the plan maintenance process.

Plan Adoption

44 CFR 201.6(c)(5) – Documentation that the plan has been formally adopted by the governing body of the jurisdiction . . .

44 CFR 201.6(d) – Plan review [process]

Once the Umatilla County NHMP is locally reviewed and ready, the Umatilla County NHMP Conveners (the Planning Director and the Emergency Manager) and the DLCD Natural Hazards Planner submit it to the State Hazard Mitigation Officer (SHMO) at Oregon's Office of Emergency Management (OEM). OEM reviews the NHMP. Once OEM reviews the NHMP and deems it ready; they submit it to the Federal Emergency Management Agency (FEMA) Region X for review. This review addresses the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201.6.

Upon pre-approval by FEMA, indicated by a letter provided from FEMA to Umatilla County called the "Approved Pending Adoption" (APA), the County will then adopt the NHMP via resolution. Following County adoption, the partner plan holders will need to adopt the NHMP. The Umatilla County NHMP Conveners and the DLCD Natural Hazards Planner will then provide both OEM and FEMA with the resolutions from the partner plan holders.

Once FEMA is provided with final resolution documentation from all the partner plan holders, they will formally approve the *2021 Umatilla County NHMP*. Umatilla County will then maintain their eligibility for the Hazard Mitigation Assistance (HMA) pre- and post- disaster funds. These funds are distributed through the Pre-Disaster Mitigation (PDM) program, the Hazard Mitigation Grant Program (HMGP), and the Flood Mitigation Assistance (FMA) program. The accomplishment of the *2021 Umatilla County NHMP* goals and mitigation actions depends upon regular NHMP Steering Committee participation and support from County, City, and Special District leadership. Thorough familiarity with this NHMP will result in the efficient and effective implementation of mitigation actions and a reduction in the risk and the potential for loss from future natural hazard events.

2021 Umatilla County MJNHMP List of Approvals

City of Milton-Freewater Approval Resolution

City of Milton-Freewater
RESOLUTION NO. 2467

A Resolution Adopting the City of Milton-Freewater's Representation in the Updates to the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan

WHEREAS, the City of Milton-Freewater recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

WHEREAS, an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre and post disaster mitigation grant programs; and

WHEREAS, the City of Milton-Freewater has fully participated in the FEMA prescribed mitigation planning process to prepare the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

WHEREAS, the City of Milton-Freewater has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of the City of Milton-Freewater to the impacts of future disasters within the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan; and*

WHEREAS, these proposed projects and programs have been incorporated into the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* that has been prepared and promulgated for consideration and implementation by the cities of Umatilla County; and

WHEREAS, the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* and pre-approved it (dated: March 20, 2019) contingent upon this official adoption of the participating governments and entities;

WHEREAS, the Natural Hazards Mitigation Plan is comprised of four volumes: Volume I – Basic Mitigation Plan, Volume II – Hazard Annexes, Volume III – City/Special District Addendums, and Volume IV – Mitigation Resources, collectively referred to herein as the Natural Hazards Mitigation Plan (NHMP); and

WHEREAS, the NHMP is in an on-going cycle of development and revision to improve its effectiveness; and

NOW THEREFORE, BE IT RESOLVED THAT the City of Milton-Freewater adopts the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* as an official plan; and

2021 Umatilla County MJNHMP List of Approvals

BE IT FURTHER RESOLVED that the City of Milton-Freewater will submit this Adoption Resolution to the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials to enable final approval of the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*

PASSED by the COMMON COUNCIL and APPROVED by the Mayor this 12th day of July, 2021.

Lewis S. Key

Lewis S. Key, Mayor

2021 Umatilla County MJNHMP List of Approvals

City of Pendleton Approval Resolution

Resolution 2843

A Resolution Adopting the City of Pendleton's Representation in the Updates to the Umatilla County Natural Hazards Mitigation Plan

Whereas, the City of Pendleton recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

Whereas, an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, the City of Pendleton has fully participated in the FEMA prescribed mitigation planning process to prepare the *Umatilla County Natural Hazards Mitigation Plan*, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

Whereas, the City of Pendleton has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of the City of Pendleton to the impacts of future disasters within the *Umatilla County Natural Hazard Mitigation Plan*; and

Whereas, these proposed projects and programs have been incorporated into the *Umatilla County Natural Hazards Mitigation Plan* that has been prepared and promulgated for consideration and implementation by the cities of Wasco County; and

Whereas, the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the *Umatilla county Natural Hazards Mitigation Plan* and pre-approved it contingent upon this official adoption of the participating governments and entities;

Whereas, the NHMP is comprised of four volumes: Volume I - Basic Mitigation Plan, Volume II – Hazard Annexes, Volume III – City/Special District Addendums, and Volume IV – Mitigation Resources, collectively referred to herein as the NHMP; and

Whereas, the NHMP is in an on-going cycle of development and revision to improve its effectiveness; and

Whereas, City of Pendleton adopts the NHMP and directs the City Manager, to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

Now, therefore, be it resolved, that the City of Pendleton adopts *the Umatilla County Natural Hazards Mitigation Plan* as an official plan; and

Be it further resolved, that the City of Pendleton will submit this Adoption Resolution to the Oregon Military Department's Office of Emergency Management and Federal

Emergency Management Agency, Region X officials to enable final approval of the *Umatilla County Natural Hazards Mitigation Plan.*

PASSED by the City Council of the City of Pendleton, Oregon, on this 15 day of June, 2021.

APPROVED:

John Turner, Mayor

ATEST:

Andrea Denton, City Recorder

Approved as to form:

Nancy Kerns, City Attorney

2021 Umatilla County MJNHMP List of Approvals

City of Pilot Rock Approval Resolution

CITY OF PILOT ROCK

RESOLUTION NO. 673

A RESOLUTION ADOPTING THE REVISED UMATILLA COUNTY NATURAL HAZARDS MITIGATION PLAN

WHEREAS on February 16, 2010, by Resolution No. 505, City Council of Pilot Rock adopted the Umatilla County Natural Hazards Mitigation Plan.

WHEREAS the plan was updated and approved in February 2014 by the Umatilla County Board of Commissioners by Order BCC2014-031.

WHEREAS the City of Pilot Rock recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

WHEREAS undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

WHEREAS an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple Federal Emergency Management Agency (FEMA) pre and post disaster mitigation grant programs; and

WHEREAS the City of Pilot Rock has fully participated in the FEMA prescribed mitigation planning process to prepare the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

WHEREAS the City of Pilot Rock has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of the City of Pilot Rock to the impacts of future disasters within the Umatilla County Multi-Jurisdictional Natural Hazard Mitigation Plan; and

WHEREAS the Oregon Military Department's Office of Emergency Management and FEMA, Region X officials have reviewed the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan and pre-approved it on June 7, 2021, contingent upon official adoption of the participating governments and entities; and

WHEREAS the Natural Hazard Mitigation Plan is comprised of three volumes: Volume I Basic Plan, Volume II Hazard Annexes, Volume III Mitigation Resources, collectively referred to herein as the Natural Hazard Mitigation Plan; and

WHEREAS the Natural Hazard Mitigation Plan is in an on-going cycle of development and revision to improve its effectiveness; and

NOW THEREFORE the City Council of the City of Pilot Rock adopts the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED that the City of Pilot Rock will submit this Resolution to the Oregon Military Department's Office of Emergency Management and FEMA, Region X officials to enable final approval of the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan.

PASSED by the City Council and **APPROVED** by the Mayor this 3rd day of August 2021.

APPROVED Virginia Carnes
Virginia Carnes, Mayor

ATTEST Teri Bacus
Teri Bacus, City Recorder

2021 Umatilla County MJNHMP List of Approvals

City of Stanfield Approval Resolution

RESOLUTION NO. 08-2021

A RESOLUTION ADOPTING THE UMATILLA COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN

WHEREAS, the City of Stanfield recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

WHEREAS, an adopted Natural Hazards Mitigation Plan (NHMP) is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS, the City of Stanfield has fully participated in the FEMA prescribed mitigation planning process to prepare the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan,* which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

WHEREAS, the City of Stanfield has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of the City to the impacts of future disasters within the *Umatilla County Multi-Jurisdictional Natural Hazard Mitigation Plan;* and

WHEREAS, these proposed projects and programs have been incorporated into the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* that has been prepared and promulgated for consideration and implementation by the cities of Umatilla County; and

WHEREAS, the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the Umatilla *County Multi-Jurisdictional Natural Hazards Mitigation Plan* and pre-approved it (dated: May 2021) contingent upon this official adoption of the participating governments and entities;

WHEREAS, the NHMP is comprised of four volumes: Volume I - Basic Mitigation Plan, Volume II - Hazard Annexes, Volume III - City/Special District Addendums, and Volume IV - Mitigation Resources, collectively referred to herein as the NHMP; and

WHEREAS, the NHMP is in an on-going cycle of development and revision to improve its effectiveness; and

WHEREAS, City of Stanfield adopts the NHMP and directs the city manager and staff to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

NOW, THEREFORE, BE IT RESOLVED, that the City of Stanfield adopts the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* as an official document; and

BE IT FURTHER RESOLVED, that the City of Stanfield will submit this Adoption Resolution to the Oregon Military Department's Office of Emergency Management and Federal

2021 Umatilla County MJNHMP List of Approvals

Emergency Management Agency, Region X officials to enable final approval of the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan.*

PASSED AND ADOPTED by the common council of the City of Stanfield this 20th day of July, 2021.

Approved: _____
Donald Tyrrell – Council President

Attest: _____
Benjamin Burgener - City Manager/Recorder

The *2021 Umatilla County MJNHMP to FEMA and OEM 5-24-21* is located on the DLCD FTP site: https://webserver.lcd.state.or.us/Uploads/Inbound

2021 Umatilla County MJNHMP List of Approvals

City of Ukiah Approval Resolution

Resolution # _2021-07-06-#1_____

A Resolution Adopting Updates to the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan

Whereas, City of Ukiah recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

Whereas, an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, City of Ukiah has fully participated in the FEMA prescribed mitigation planning process to prepare the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

Whereas, City of Ukiah has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of the impacts of future disasters within the *Umatilla County Multi-Jurisdictional Natural Hazard Mitigation Plan*; and

Whereas, these proposed projects and programs have been incorporated into the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* that has been prepared and promulgated for consideration and implementation by City of Ukiah; and

Whereas, the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the *Umatilla County, Multi-Jurisdictional Natural Hazards Mitigation Plan* and pre-approved it (dated: June 7, 2021) contingent upon this official adoption of the participating governments and entities;

Whereas, the NHMP is comprised of three volumes: Volume I - Basic Mitigation Plan, Volume II – Hazard Annexes, Volume III – Mitigation Resources; and

Whereas, the NHMP is in an on-going cycle of development and revision to improve its effectiveness; and

Whereas, City of Ukiah adopts the NHMP and directs the city staff to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

Now, therefore, be it resolved, that City of Ukiah adopts *the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* as an official plan; and

Be it further resolved, that City of Ukiah will submit this Adoption Resolution to the Oregon Military Department's Office of Emergency Management and Federal

2021 Umatilla County MJNHMP List of Approvals

Emergency Management Agency, Region X officials to enable final approval of the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan.*

Adopted this 6th day of July, 2021

Chuck Barbo

Certifying Official

2021 Umatilla County MJNHMP List of Approvals

Umatilla County
Natural Hazards Mitigation Plan Update

UMATILLA COUNTY
est. 1862

About the Plan

Umatilla County's existing Natural Hazards Mitigation Plan (NHMP) expired in 2019. NHMPs must be updated every five years.

Umatilla County is collaborating with the Oregon Department of Land Conservation and Development (DLCD) to update the NHMP. The updated NHMP will be a multi-jurisdictional document that includes the county's 12 incorporated cities and several special districts. The updated NHMP will ensure the county, cities, and special districts maintain eligibility for federal disaster-related funding.

This project is made possible by the federal Hazard Mitigation Grant Program (HMGP). The HMGP assists states, tribes, and local communities in implementing long-term hazard mitigation measures following a major disaster declaration to reduce the risk of loss of life and property from future disasters.

A Steering Committee, co-chaired by County Emergency Manager, Thomas Roberts, and County Planning Director, Robert Waldher, is working with DLCD to update the NHMP. The NHMP is targeted for completion and adoption by mid-2021.

DLCD

Umatilla County Natural Hazards

Winter Storms • Summer Storms • Earthquakes

Droughts • Floods • Volcanic Events

Landslides • Wildfire

"to prevent loss and protect life, property and the environment from the risk of natural hazards through coordination and cooperation among public and private partners"
Umatilla County 2014 NHMP

Recent flood disasters in Umatilla County highlight the critical need for improving community resiliency to these types of events and maintaining disaster-related funding.

Why engage in natural hazard mitigation planning?

- **to avoid disasters** by reducing or eliminating long-term risk to people, property, and the environment from natural hazards
- **to increase safety and resilience** by integrating hazard mitigation into local plans, programs and policies
- **to maintain eligibility** for disaster-related funding

MORE INFORMATION:

Thomas Roberts, Emergency Manager | Umatilla County
Phone: 541-966-3706 | Email: thomas.roberts@umatillacounty.net

Robert Waldher, Planning Director | Umatilla County
Phone: 541-278-6252 | Email: robert.waldher@umatillacounty.net

2021 Umatilla County MJNHMP List of Approvals

City of Umatilla Approval Resolution

RESOLUTION NO. 05 – 2022

A RESOLUTION ADOPTING THE CITY OF UMATILLA REPRESENTATION IN THE UPDATES TO THE UMATILLA COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN

Whereas, the City of Umatilla recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

Whereas, an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, the City of Umatilla has fully participated in the FEMA prescribed mitigation planning process to prepare the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

Whereas, the City of Umatilla has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of the City of Umatilla to the impacts of future disasters within the *Umatilla County Multi-Jurisdictional Natural Hazard Mitigation Plan*; and

Whereas, these proposed projects and programs have been incorporated into the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* that has been prepared and promulgated for consideration and implementation by the cities of Umatilla County; and

Whereas, the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region 10 officials have reviewed the *Umatilla County, Multi-Jurisdictional Natural Hazards Mitigation Plan* and pre-approved it (dated: June 7th, 2021) contingent upon this official adoption of the participating governments and entities;

Whereas, the NHMP is comprised of four volumes: Volume I - Basic Mitigation Plan, Volume II – Hazard Annexes, Volume III – City/Special District Addendums, and Volume IV – Mitigation Resources, collectively referred to herein as the NHMP; and

Whereas, the NHMP is in an on-going cycle of development and revision to improve its effectiveness; and

Whereas, City of Umatilla adopts the NHMP and directs Staff to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

Now, therefore, be it resolved, that the City of Umatilla adopts *the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* as an official plan; and

Be it further resolved, that the City of Umatilla will submit this Adoption Resolution to the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region 10 officials to enable final approval of the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan.*

PASSED by the City Council and **SIGNED** by the Mayor this 6th day of July, 2021.

Mary Dedrick, Mayor

ATTEST:

Nanci Sandoval, City Recorder

CITY OF UMATILLA OR SEAL

2021 Umatilla County MJNHMP List of Approvals

City of Weston Approval Resolution

Resolution # 21-03

A Resolution Adopting the City of Weston's Representation in the Updates to the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan

Whereas, the City of Weston recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

Whereas, an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, the City of Weston has fully participated in the FEMA prescribed mitigation planning process to prepare the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

Whereas, the City of Weston has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of the City of Weston to the impacts of future disasters within the *Umatilla County Multi-Jurisdictional Natural Hazard Mitigation Plan*; and

Whereas, these proposed projects and programs have been incorporated into the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* that has been prepared and promulgated for consideration and implementation by the cities of Umatilla County; and

Whereas, the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the *Umatilla County, Multi-Jurisdictional Natural Hazards Mitigation Plan* and pre-approved it (dated: March 20, 2019) contingent upon this official adoption of the participating governments and entities;

Whereas, the NHMP is comprised of four volumes: Volume I - Basic Mitigation Plan, Volume II – Hazard Annexes, Volume III – City/Special District Addendums, and Volume IV – Mitigation Resources, collectively referred to herein as the NHMP; and

Whereas, the NHMP is in an on-going cycle of development and revision to improve its effectiveness; and

Now, therefore, be it resolved, that the City of Weston adopts *the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* as an official plan; and

Be it further resolved, that the City of Weston will submit this Adoption Resolution to the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency, Region X officials to enable final approval of the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan.*

2021 Umatilla County MJNHMP List of Approvals

Adopted by the City Council of Weston this 9th day of June, 2021

Duane Thul, Mayor

Attested Sheila Jasperson, City Recorder

2021 Umatilla County MJNHMP List of Approvals

Stanfield Irrigation District Approval Resolution

Stanfield Irrigation District

RESOLUTION TO APPROVE

The Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan

WHEREAS, on August 31, 2020 Stanfield Irrigation District entered into an Intergovernmental Agreement with the Department of Land Conservation and Development; and

WHERAS, the Disaster Mitigation Act of 2000 and the regulations contained in 44 CFR 201 require that jurisdictions maintain an approved NHMP to receive federal funds for pre and post disaster mitigation grants; and

WHERAS, undertaking hazard mitigation actions will mitigate the impacts of natural hazards and increase the resiliency of our community in our efforts to protect life, property and the environment; and

WHEREAS, Umatilla County has submitted the Multi-Jurisdictional Natural Hazards Mitigation Plan to Oregon Emergency Management and received an Approval Pending Adoption letter from the United States Department of Homeland Security through the Federal Emergency Management Agency stating that is has been found to be in compliance with all required elements of 44 CFR 201.6, as well as identifies the jurisdictions participating in the planning process and requires that formal Resolution adopting of the NHMP be submitted to FEMA Region 10 by each jurisdiction within one calendar year; therefore

IT IS HEREBY RESOLVED, that Stanfield Irrigation District and its Board of Directors approves and adopts the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan as an official plan.

This Resolution adopted at the Board of Directors Meeting of the Stanfield Irrigation District on July 14, 2021.

Ray Kopacz – District Manager/Secretary

Patrick Walchli, Division 1

Darrin Ditchen, Division 2

Steve Walker, Division 3

Dan Mills, Division 4

Randy Cooper, Division 5

2021 Umatilla County MJNHMP List of Approvals

Hermiston Irrigation District Approval Resolution

Resolution No. HID2021-5

RESOLUTION APPROVING THE UMATILLA COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN

WHEREAS, on August 18, 2020 Hermiston Irrigation District entered into an Intergovernmental Agreement with the State of Oregon through the Department of Land Conservation and Development; and

WHEREAS, The Disaster Mitigation Act of 2000 and the regulations contained in 44 CFR 201 require that jurisdictions maintain an approved NHMP to receive federal funds for pre- and post-disaster mitigation grants; and

WHEREAS, undertaking hazard mitigation actions will mitigate the impacts of natural hazards and increase the resiliency of our community in our efforts to protect life, property and the environment; and

WHEREAS, Umatilla County has submitted the Multi-Jurisdictional Natural Hazards Mitigation Plan to Oregon Emergency Management and received and Approval Pending Adoption letter from the United States Department of Homeland Security through the Federal Emergency Management Agency stating that it has been found to be in compliance with all required elements of 44 CFR 201.6, as well as identifies the jurisdictions participating in the planning process and requires that formal adoption of the document be submitted to FEMA Region 10 by each jurisdiction within one calendar year; therefore

IT IS HEREBY RESOLVED that the Board of Directors of the Hermiston Irrigation District approves and adopts the Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan as an official plan.

This Resolution adopted at the Board of Directors Meeting of the Hermiston Irrigation District on June 10, 2021.

Bryan Allstott, Division 1

Michael Bergstrom, Division 2

Ian Findley, Division 3

Bryon Zumwalt, Division 4

ABSENT
Jeremy Bolen, Division 5

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Walla Walla River Irrigation District Approval Resolution

Walla Walla River Irrigation District
PO Box 248/323 Evans Street
Milton-Freewater, Oregon 97862
541-938-0144
teresa@wwriver.com

RESOLUTION NUMBER 2021-03

A RESOLUTION BY THE BOARD OF DIRECTORS OF THE WALLA WALLA RIVER IRRIGATION DISTRICT, UMATILLA COUNTY, OREGON, TO APPROVE AND ADOPT THE UMATILLA COUNTY NATURAL HAZARDS MITIGATION PLAN.

WHEREAS, the Walla Walla River Irrigation District recognizes the threat that natural hazards pose to people, property, and infrastructure in our District; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

WHEREAS, the Walla Walla River Irrigation District in conjunction with Umatilla County has received approval of the Umatilla County Natural Hazard Mitigation Plan from the United States Department of Homeland Security FEMA; and

WHEREAS, the Umatilla County Natural Hazards Mitigation Plan is compliant with all required elements of 44 CFR Part 201.6, as well as identifies the jurisdictions participating in the planning process; and

WHEREAS, having a Umatilla County Natural Hazard Mitigation Plan will make the Walla Walla River Irrigation District eligible for reimbursement if a Natural Hazard incurs.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE WALLA WALLA RIVER IRRIGATION DISTRICT THAT WE HEREBY APPROVE AND ADOPT THE UMATILLA COUNTY NATURAL HAZARDS MITIGATION PLAN AS OUR OFFICIAL HAZARDS MITIGATION PLAN FOR THE WALLA WALLA RIVER IRRIGATION DISTRICT.

APPROVED and ADOPTED by the Board of Directors this 8th **DAY OF July, 2021.**

Ronald E Brown
Alan Davis

2021 Umatilla County MJNHMP List of Approvals

Umatilla County Soil and Water Conservation District Approval Resolution

Umatilla County Soil and Water Conservation District
1 SW Nye Ave. Suite 130
Pendleton, OR 97801
Phone: 541-278-8049 Ext. 138

Resolution of the ____Umatilla___ Soil and Water Conservation District
Resolution # 2021-1

A Resolution of the Umatilla County SWCD Approving of the Umatilla County Natural Hazards Mitigation Plan

Whereas, the Umatilla County SWCD recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

Whereas, an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, the Umatilla County SWCD has fully participated in the FEMA prescribed mitigation planning process to prepare the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

Whereas, the Umatilla County SWCD has identified natural hazard risks and prioritized several proposed actions and programs needed to mitigate the vulnerabilities of Umatilla County to the impacts of future disasters within the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan*; and

Whereas, these proposed projects and programs have been incorporated into the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* that has been prepared and promulgated for consideration and implementation by Umatilla County, the cities, and special districts of Umatilla County; and

Whereas, the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency officials have reviewed the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* and pre-approved it contingent upon this official adoption of the participating governments and entities;

Whereas, the NHMP is in an on-going cycle of development and revision to improve its effectiveness; and

Whereas, the Umatilla County SWCD adopts the NHMP and directs the District Manager to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

2021 Umatilla County MJNHMP List of Approvals

Umatilla County Soil and Water Conservation District
1 SW Nye Ave. Suite 130
Pendleton, OR 97801
Phone: 541-278-8049 Ext. 138

Now, therefore, be it resolved, that the Umatilla County SWCD adopts *The Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan* as an official plan; and

Be it further resolved, that the Umatilla County Soil and Water Conservation District will submit this Adoption Resolution to the Oregon Military Department's Office of Emergency Management and Federal Emergency Management Agency officials to enable final approval of the *Umatilla County Multi-Jurisdictional Natural Hazards Mitigation Plan.*

Signature of District Chair

6/15/21
Date of Board Action

Volume I: Basic Plan

Ice Jam along Umatilla River, Credit: Pendleton National Weather Service

Source: Megan Green, Umatilla County, personal communication, 3/11/21

Flooding at Maxwell Canal Fish Screens (Umatilla River), February 2020, Credit: Hermiston Irrigation District

Source: Megan Green, Umatilla County, personal communication, 3/11/21

Special Thanks & Acknowledgements

Umatilla County developed this Multi-Jurisdictional Natural Hazards Mitigation Plan (NHMP) through a partnership funded by the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP). In 2020, the Department of Land Conservation and Development (DLCD) applied for and received the HMGP grant from DR-4432 from FEMA through the Oregon Office of Emergency Management (OEM) to assist Umatilla County, the twelve incorporated cities, and four special districts (identified as partners that are plan holders* because they have signed IGAs with DLCD) with the update to the expired *2014 Umatilla County NHMP*. This *2021 Umatilla County NHMP* is the result of a substantial collaborative effort between DLCD, Umatilla County, and all participating organizations (plan holders and others) The *2021 Umatilla County Natural Hazards Mitigation Plan* is structured to address the requirements contained in 44 CFR 201.6. Emphasis is placed on identifying and describing the unique attributes of the County, Cities, and Special Districts.

Lead Partners and Partners that are Plan Holders* Include:

Umatilla County
Adams
Athena
Echo
Helix
Hermiston
Milton-Freewater
Pendleton
Pilot Rock
Stanfield
Ukiah
Umatilla
Weston
Hermiston Irrigation District
Stanfield Irrigation District
Umatilla County Soil and Water Conservation District
Walla Walla River Irrigation District
Oregon Office of Emergency Management (OEM)
Oregon Department of Land Conservation and Development (DLCD)
Federal Emergency Management Agency (FEMA) Region X

Project Managers:

Tricia Sears, Natural Hazards Planner, DLCD
Robert Waldher, Planning Director, Umatilla County

All Participants / Partners on the NHMP Steering Committee

Representatives from the following organizations served as steering committee members for the Umatilla County Natural Hazards Mitigation Plan update process. Partners that are plan holders are those organizations or jurisdictions that signed IGAs with DLCD for the work on the NHMP. These plan holders are: Umatilla County, Adams, Athena, Echo, Helix, Hermiston, Milton-Freewater, Pendleton, Pilot Rock, Stanfield, Ukiah, Umatilla, Weston, Hermiston Irrigation District, Stanfield Irrigation District, Umatilla County Soil and Water Conservation District, and the Walla Walla River Irrigation District. All participants on the NHMP Steering Committee are listed below.

Department of Land Conservation & Development Staff

Tricia Sears, Natural Hazards Planner, DLCD

Umatilla County

Bob Waldher	Planning Director, Convenor
Megan Green	Planner II/GIS
Tierney Cimmiyotti	Planning Admin
Tom Roberts	Emergency Manager, Convenor
Dan Dorran	Commissioner
John Shafer	Commissioner
Gina Miller	Smoke Management

Adams

Graham Alderson	City Councilor

Athena

Michelle Fox	City Recorder

Echo

Dave Slaght	City Administrator

Helix

Josh Smith	Public Works
Kim Herron	Mayor

Hermiston

Clinton Spencer	City Planner

Milton-Freewater

Shane Garner	Fire Chief

Pendleton

George Cress	City Planner
Bob Patterson	Public Works Director
Greg Lacquement	Regulatory Specialist, Public Works

Pilot Rock

Teri Bacus	City Recorder

Stanfield

Benjamin Burgener	City Manager

Ukiah

Donna Neumann	City Recorder

Umatilla

Brandon Seitz	Community Development Director
Jacob Foutz	Associate Planner
Darla Huxel	Police Chief
Keith Kennedy	Police Lieutenant

Weston

Duane Thul	Mayor

Hermiston Irrigation District

Annette Kirkpatrick	District Manager

Stanfield Irrigation District

Ray Kopacz	District Manager
Tiffany Harrell	Office Manager

Umatilla County Soil and Conservation District

Kyle Waggoner	District Manager

Walla Walla River Irrigation District

Teresa Kilmer	District Manager

National Weather Service/ NOAA

Vincent Papol	Senior Meteorologist
Marcus Austin	Warning Coordination Meteorologist

Confederated Tributes of the Umatilla Indian Reservation

Patty Perry	Senior Planner
Rob Burnside	Public Safety Director
Caleb Minthorn	Air Quality Technician

Greater Eastern Oregon Development Corporation

Susan Christensen	Executive Director
Bree Cubrilovic	RARE AmeriCorps

Clearview Disability Resource Center

Darrin Umbarger	Chief Executive Officer

US Army Corps of Engineers – Walla Walla & Portland Distr.

Jim Gonzalez	Emergency Operations
Linda Campbell	Emergency Readiness Chief
Michelle Frost	Catastrophic Disaster Response Manager

Oregon Energy Trust

Caryn Appler	Eastern Oregon Outreach Manager
Jeni Hall	Program Manager – Advanced Solar

Other Participants

Brad Humbert	Milton-Freewater Water Control District
Scott Stanton	Umatilla County Fire District #1
Dave Baty	East Umatilla Fire & Rescue District
Matt Hoehna	Oregon Department of Forestry
Brett Thomas	USDA – Umatilla National Forest
Troy Baker	Walla Walla Basin Watershed Council
Terry Rowan	Umatilla County Sheriff's Office
Jim Littlefield	Umatilla County Sheriff's Office
LG Bullock	Umatilla County Public Works
Anne Debbaut	DLCD, Regional Representative
Meghan Dalton	Oregon Climate Change Research Institute (OCCRI)
Amie Bashant	OEM, State Hazard Mitigation Officer

About the Oregon Department of Land Conservation and Development

Oregon's statewide land use planning program — originated in 1973 under Senate Bill 100 — provides protection of farm and forest lands, conservation of natural resources, orderly and efficient development, coordination among local governments, and citizen involvement. The program affords all Oregonians predictability and sustainability to the development process by allocating land for industrial, commercial and housing development, as well as transportation and agriculture. The Department of Land Conservation and Development (DLCD) administers the program. A seven-member volunteer citizen board known as the Land Conservation and Development Commission (LCDC) guides DLCD. Under the program, all cities and counties have adopted comprehensive plans that meet mandatory state standards that address land use, development, housing, transportation, and conservation of natural resources. Periodic review of plans and technical assistance in the form of grants to local jurisdictions are key elements of the program.[1]

[1] DLCD, http://www.oregon.gov/LCD/Pages/about_us.aspx, accessed November 14, 2018.

Umatilla County
Multi-Jurisdictional
Natural Hazards Mitigation Plan

Table of Contents

Executive Summary

Umatilla County developed and updated this *2021 Umatilla County Multi-jurisdictional Natural Hazards Mitigation Plan* (*2021 Umatilla County NHMP*) to prepare for and to mitigate the short- and long-term effects resulting from natural hazards. It is not possible to predict exactly when these hazards will occur, or the extent to which they will affect the community. However, with careful planning and collaboration among the whole community (https://www.fema.gov/whole-community) - public agencies at local, state and federal levels; private sector organizations; businesses; families and individuals; non-profit groups; schools and academia; media outlets; faith based and community organizations - a resilient community can be created that benefits from mitigation planning, including this *2021 Umatilla County NHMP,* and short- and long-term recovery planning efforts, which are described in other plans.

44 CFR 201.6 – The local mitigation plan is the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. . . .

The Federal Emergency Management Agency (FEMA) defines mitigation as ". . . the effort to reduce loss of life and property by lessening the impact of disasters . . . through risk analysis, which results in information that provides a foundation for mitigation activities that reduce risk." Said another way, natural hazard mitigation is a method of reducing or alleviating the impacts to life, property, and the environment resulting from natural hazards through short- and long-term strategies. Example strategies include policy changes, such as updated ordinances, and projects, such as seismic retrofits to critical facilities; and education and outreach to targeted audiences, such as Spanish speaking residents or the elderly. Natural hazard mitigation is the responsibility of the whole community.

Why Develop this Mitigation Plan?

44 CFR 201.6(a)(1) – A local government must have a mitigation plan approved pursuant to this section in order to receive HMGP project grants . . .

In addition to establishing a comprehensive community-level mitigation strategy, the Disaster Mitigation Act of 2000 (DMA2K) and the regulations contained in 44 CFR 201 require that jurisdictions maintain an approved NHMP to receive federal funds for mitigation projects. Local and federal approval of this plan ensures that Umatilla County, the twelve cities, and the four special districts (identified as plan holders and all listed below) will remain eligible for pre- and post-disaster mitigation grants.

Who Participated in Developing the Plan?

The Oregon Department of Land Development and Conservation (DLCD) led the Umatilla County NHMP Steering Committee through the NHMP update process. Umatilla County, the twelve incorporated cities, and four special districts (identified as plan holders because they have signed IGAs with DLCD) collaborated with many others to update to the expired *2014 Umatilla County*

NHMP. This *2021 Umatilla County NHMP* is the result of a substantial collaborative effort between DLCD, Umatilla County, and all participating organizations (plan holders and others). Partners are plan holders are those organizations or jurisdictions that signed IGAs with DLCD for the work on the NHMP. These plan holders are listed in the bullet points below. Other partner organizations include: Federal Emergency Management Agency, Oregon Office of Emergency Management, Oregon Climate Change Research Institute, National Weather Service, USDA-Umatilla National Forest, Oregon Department of Forestry, Clearview Disability Resource Center, Confederated Tribes of the Umatilla Indian Reservation, U.S. Army Corps of Engineers, Greater Easter Oregon Development Corporation, Oregon Energy Trust, Umatilla County Fire District #1, East Umatilla Fire & Rescue District, Walla Walla Basin Watershed District, and the Milton-Freewater Water Control District.

The Umatilla County NHMP Steering Committee includes these partner plan holder organizations:

44 CFR 201.6(c)(1) – Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

- Umatilla County
- City of Adams
- City of Athena
- City of Echo
- City of Helix
- City of Hermiston
- City of Milton-Freewater
- City of Pendleton
- City of Pilot Rock
- City of Stanfield
- City of Ukiah
- City of Umatilla
- City of Weston
- Hermiston Irrigation District
- Stanfield Irrigation District
- Umatilla County Soil and Water Conservation District
- Walla Walla River Irrigation District

See the Acknowledgements section for the full list of organizations and representatives that participated on the NHMP Steering Committee.

In collaboration with DLCD, the Umatilla County Planning Director and the Emergency Manager convened the planning process. The Umatilla County Planning Director and the Emergency Manager (or their perspective delegates) will take the lead in implementing, maintaining, and updating the NHMP. Umatilla County is dedicated to directly involving the public in the continual review and update of the NHMP. The County will post the *2021 Umatilla County Multi-jurisdictional Natural Hazards Mitigation Plan* on the County's website. The Cities and Special Districts will also post the NHMP on their websites.

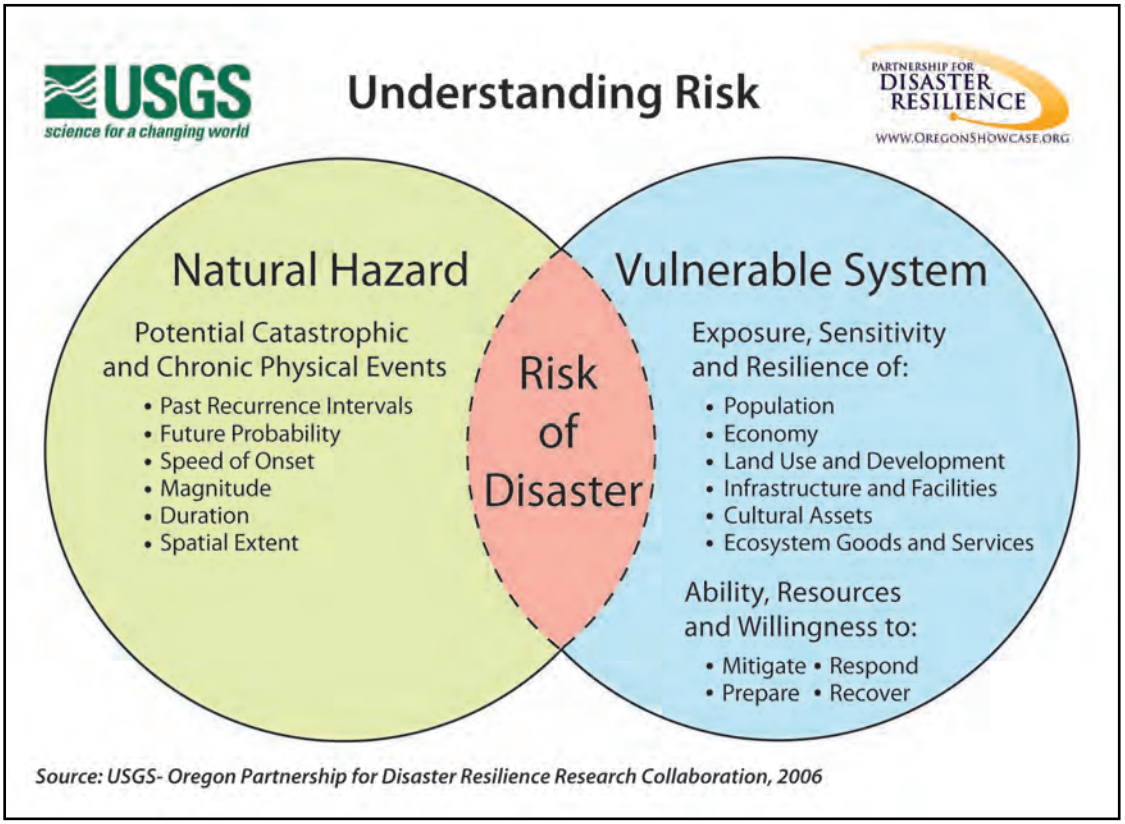
This NHMP was developed through a partnership funded by FEMA's Hazard Mitigation Grant Program (HMGP). In 2020, DLCD applied for and received funding under HMGP funds available due to DR-4432 from FEMA through Oregon's Office of Emergency Management (OEM).

How Does this Mitigation Plan Reduce Risk?

44 CFR 201.6(c)(2) – A Risk Assessment that provides the factual basis for activities proposed in the strategy . . .

The NHMP is intended to assist Umatilla County to reduce the risk from natural hazards by identifying resources, information, and strategies for risk reduction. It will also help guide and coordinate mitigation activities throughout Umatilla County. A key part of the NHMP is the risk assessment. It consists of three phases: hazard identification, vulnerability assessment, and risk analysis. In Figure ES-1, the identification of natural hazards that could impact the community (natural hazard) and the exposure, sensitivity, and resilience of community (vulnerable system) overlap to create the risk of disaster. Recognizing and understanding these three phases is a key to natural hazard mitigation planning.

Figure ES-1 Understanding Risk



Source: USGS and Oregon Partnership for Disaster Resilience, 2006.

By identifying and understanding the relationship between natural hazards, vulnerable systems, and existing capacity, Umatilla County is better equipped to identify and implement actions aimed at reducing the overall risk to natural hazards. Volume I Section 2 Risk Assessment and Volume II Hazard Annexes provide details on the natural hazards in Umatilla County, the Cities, and the Special Districts, as well as the vulnerabilities and risks. Mitigation actions are identified to help reduce risk; see Section 3 Mitigation Strategy for details on mitigation actions.

What is the County's Overall Risk to Hazards?

Umatilla County, along with the Cities, the Special Districts, and other partners, reviewed and updated their risk assessment to evaluate the probability of each natural hazard as well as the vulnerability of the community to that hazard. All the previously identified natural hazards were retained for this NHMP. One new natural hazard, air quality, was added during the Hazard Vulnerability Assessment (HVA). The NHMP Steering Committee performed the HVA at the September 29, 2020 meeting. It was discussed again at the October 27, 2020 meeting. Table ES-1 summarizes the risk score and risk level for each hazard as determined by the Umatilla County NHMP Steering Committee. See also Volume I Section 2 Risk Assessment and Volume II Hazard Annexes for additional hazard information.

Table ES-1 Natural Hazards, Risk Scores, and Risk Levels for Umatilla County

HAZARD	RISK SCORE	RISK LEVEL (H-M-L)
Floods	240	High
Air Quality	224	High
Severe Summer Storm	223	High
Severe Winter Storm	220	High
Wildfire	203	High
Drought	184	Medium
Earthquakes	151	Medium
Volcano	127	Medium
Landslides/Debris Flows	85	Low

Source: DLCD Natural Hazards Planner, Tricia Sears, and the Umatilla County NHMP Steering Committee, 2020.

What is the Plan's Mission?

The mission of Umatilla County's NHMP was updated from the *2014 Umatilla County NHMP* for the *2021 Umatilla County NHMP*.

Mission:

To prevent loss and protect life, property, and the environment from natural hazards through coordination and cooperation among public and private partners. To mitigate the impacts of natural hazards and to increase the resilience of our community in our efforts to protect life, property, and the environment.

What are the Plan Goals?

44 CFR 201.6(c)(3)(i) – A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

The plan goals describe the overall direction that the participating jurisdiction's agencies, organizations, and citizens can take toward mitigating risk from natural hazards. The Umatilla County NHMP Steering Committee retained the goals as is from the *2014 Umatilla County NHMP* for the *2021 Umatilla County NHMP*.

Goal 1: Protect life and property.

Goal 2: Public outreach.

Goal 3: Planned prevention.

Goal 4: Agency/citizen coordination.

Goal 5: Natural resource protection.

Goal 6: Emergency service planning.

How are the Mitigation Actions Organized?

44 CFR 201.6(c)(3)(ii) – A section that identifies and analyzes a comprehensive range of specific mitigation actions . . .

The mitigation actions are organized within a Mitigation Actions Table included within Section 3 Mitigation Strategy. Full descriptions of each mitigation action are provided in Appendix A Mitigation Action Forms. The Steering Committee agreed to use the risk level scores and rankings from the Hazard Vulnerability Assessment (HVA) - shown in summary in Table ES-1 - as a way to prioritize the mitigation actions. As a result of this, the high priority actions are all of the multi-hazard (MH) actions and the hazard-specific actions for floods, air quality, severe summer storms, severe winter storms, and wildfire. Floods and air quality are the two hazards with the highest risk scores, with floods obtaining 240 out of 240 points. Drought, earthquakes, and volcanoes have a risk level of medium and thus the mitigation actions are medium. Landslides/debris flows are low risk level and thus are low priority mitigation actions. Data collection, research, Steering Committee discussion, and the public participation process resulted in the development of the mitigation actions.

The 2021 Umatilla County NHMP Mitigation Actions is Table 3-1 and the Umatilla County Mitigation Actions 2014 Status is Table 3-2; both are in the Section 3 Mitigation Strategy.

The mitigation actions portray the overall plan framework and identify links between the plan goals and actions. Tables 3-1 and 3-2 document the title of each action along with the coordinating organization, timeline, and the plan goals addressed. Each participating jurisdiction is identified.

There are **80 total mitigation actions** in the *2021 Umatilla County NHMP*. By natural hazard, the totals are as follows: multi-hazard (MH) = 24; drought (DR) = 3; earthquake (EQ) = 2; flood (FL) = 23; severe summer storms and severe winter storms (SS) = 7; wildfire (WF) = 10; volcanoes (VO) = 1, landslides/debris flows (LS) = 2, and air quality (AQ) = 8 (new in 2020).

The mitigation actions include both short and long-term activities. Each action includes an estimate of the timeline for implementation.

- *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to two years.
- *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement.
- *Ongoing action items* are activities that are currently being performed and will continue into the foreseeable future.

How will the plan be implemented?

44 CFR 201.6(c)(3)(iii) – An action plan describing how the actions . . . will be prioritized, implemented and administered . . .

44 CFR 201.6(c)(4) – A plan maintenance process . . .

Section 4 Plan Implementation and Maintenance details the formal process that will ensure that the *2021 Umatilla County NHMP* remains an active and relevant document. The plan will be implemented, maintained and updated by a designated convener. The Umatilla County Planning Director and the Emergency Manager are the designated conveners and are responsible for overseeing the review and implementation processes. The plan maintenance process includes a schedule for monitoring and evaluating the plan twice per year and updating the NHMP every five years to maintain eligibility for pre- and post-disaster funds from FEMA. This section of the NHMP describes how the communities will integrate public participation throughout the plan maintenance process.

Plan Adoption

44 CFR 201.6(c)(5) – Documentation that the plan has been formally adopted by the governing body of the jurisdiction . . .

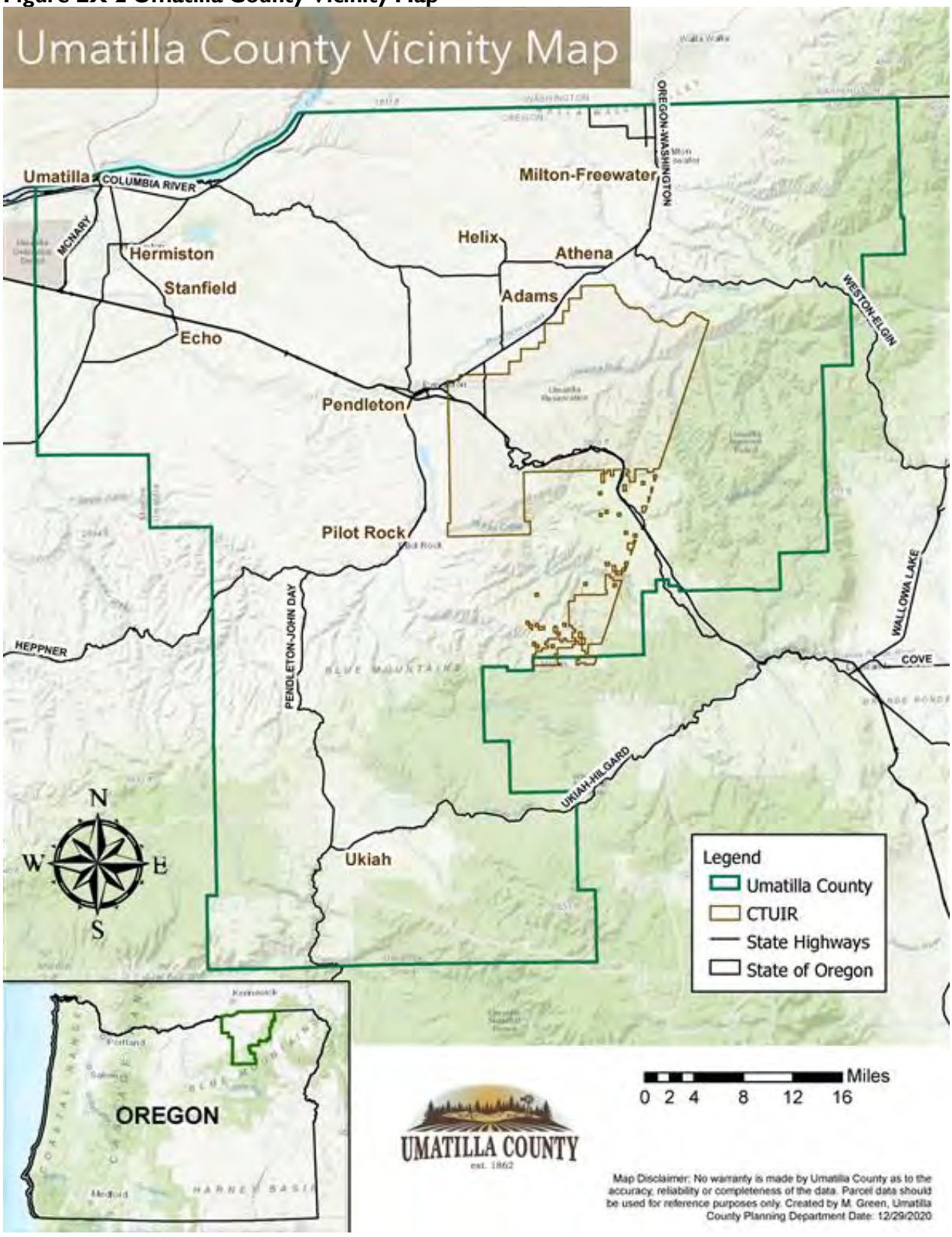
44 CFR 201.6(d) – Plan review [process] . . .

Once the Umatilla County NHMP is locally reviewed and ready, the Umatilla County NHMP Conveners (the Planning Director and the Emergency Manager) and the DLCD Natural Hazards Planner submit it to the State Hazard Mitigation Officer (SHMO) at Oregon's Office of Emergency Management (OEM). OEM reviews the NHMP. Once OEM reviews the NHMP and deems it ready; they submit it to the Federal Emergency Management Agency (FEMA) Region X for review. This review addresses the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201.6.

Upon pre-approval by FEMA, indicated by a letter provided from FEMA to Umatilla County called the "Approved Pending Adoption" (APA), the County will then adopt the NHMP via resolution. Following County adoption, the partner plan holders will need to adopt the NHMP. The Umatilla County NHMP Conveners and the DLCD Natural Hazards Planner will then provide both OEM and FEMA with the resolutions from the partner plan holders.

Once FEMA is provided with final resolution documentation from all the partner plan holders, they will formally approve the *2021 Umatilla County NHMP*. Umatilla County will then maintain their eligibility for the Hazard Mitigation Assistance (HMA) pre- and post- disaster funds. These funds are distributed through the Pre-Disaster Mitigation (PDM) program, the Hazard Mitigation Grant Program (HMGP), and the Flood Mitigation Assistance (FMA) program. The accomplishment of the *2021 Umatilla County NHMP* goals and mitigation actions depends upon regular NHMP Steering Committee participation and support from County, City, and Special District leadership. Thorough familiarity with this NHMP will result in the efficient and effective implementation of mitigation actions and a reduction in the risk and the potential for loss from future natural hazard events.

Figure EX-2 Umatilla County Vicinity Map



Source: Megan Green, Umatilla County, 12/29/20

Section I: Introduction

This section provides a general introduction to natural hazard mitigation planning in Umatilla County. In addition, Section I: Introduction addresses the planning process requirements contained in 44 CFR 201.6(b) thereby meeting the planning process documentation requirement contained in 44 CFR 201.6(c)(1). The section concludes with a general description of how the plan is organized.

What is Natural Hazard Mitigation?

The Federal Emergency Management Agency (FEMA) defines mitigation as ". . . the effort to reduce loss of life and property by lessening the impact of disasters . . . through risk analysis, which results in information that provides a foundation for mitigation activities that reduce risk."[1] Said another way, natural hazard mitigation is a method of permanently reducing or alleviating the losses of life, property, and injuries resulting from natural hazards through long and short-term strategies. Example strategies include policy changes, such as updated ordinances, projects, such as seismic retrofits to critical facilities; and education and outreach to targeted audiences, such as Spanish speaking residents or the elderly. Natural hazard mitigation is the responsibility of the "Whole Community" – individuals and families; private businesses and industries; non-profit groups; schools and academia; media outlets; faith based and community organizations; and federal, state, and local governments.[2]

Engaging in mitigation activities provides jurisdictions with a number of benefits, including reduced loss of life, property, essential services, critical facilities and economic hardship; reduced short-term and long-term recovery and reconstruction costs; increased cooperation and communication within the community through the planning process; and increased potential for state and federal funding for recovery and reconstruction projects.

Why Develop a Mitigation Plan?

It is not possible to predict exactly when natural hazard events will occur, or the extent to which they will affect community assets. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the impacts and losses that can result from natural hazards.

Umatilla County developed this Natural Hazards Mitigation Plan (NHMP), with the twelve incorporated cities, and four special districts (identified as plan holders because they have signed IGAs with DLCD), and other partners in an effort to reduce future loss of life and damage to property resulting from natural hazards. The current Umatilla County NHMP Steering Committee is doing an update to the *2014 Umatilla County NHMP* that expired in 2019. With the FEMA approval of the *2021 Umatilla County NHMP*, Umatilla County will then maintain their eligibility for the Hazard

[1] FEMA, *What is Mitigation?* http://www.fema.gov/what-mitigation, accessed December 20, 2018,

[2] FEMA, *Whole Community*, https://www.fema.gov/whole-community, accessed December 20, 2018.

Mitigation Assistance (HMA) pre- and post- disaster funds. In addition to establishing a comprehensive community-level mitigation strategy, the Disaster Mitigation Act of 2000 (DMA2K) and the regulations contained in 44 CFR 201 require that jurisdictions maintain an approved NHMP in order to receive federal funds for pre- and post- disaster mitigation funds.

What Federal Requirements Does This Plan Address?

DMA2K is a key piece of federal legislation addressing natural hazards mitigation planning. It reinforces the importance of mitigation planning and emphasizes planning for natural hazards before they occur. As such, this Act established the Pre-Disaster Mitigation (PDM) grant program (which has become the Building Resilient Infrastructure and Communities aka BRIC program) and requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP).

Section 322 of the Act specifically addresses mitigation planning at the state and local levels. State and local jurisdictions must have approved NHMPs to qualify to receive post-disaster HMGP funds. NHMPs must demonstrate that the proposed mitigation actions are based on a sound planning process that accounts for the risk to the individual and their capabilities. Chapter 44 Code of Federal Regulations (CFR), section 201.6, also requires a local government to have an approved NHMP in order to receive HMGP project grants.[3]

Pursuant of Chapter 44 CFR, the Natural Hazard Mitigation Plan planning processes shall include opportunity for the public to comment on the plan during review, and the NHMP shall include documentation of the public planning process used to develop the plan.[4] The NHMP update must also contain a risk assessment, mitigation strategy and a plan maintenance process that has been formally adopted by the governing body.

Development of the *2021 Umatilla County NHMP* was pursued in compliance with subsections from 44 CFR 201.6 guidelines. These four subsections address plan requirements, the planning process, plan content, and plan review.

- Subsection (a) provides an outline of the overall plan requirements, including an overview of general plan components, exceptions to requirements, and multi-jurisdictional participation.
- Subsection (b) outlines the requirements of the planning process, with particular focus on public involvement in the update process, as well as the role of local agencies, organizations and other relevant entities in the development process, as well as standards for adequate levels of review and incorporation of existing plans and policies.
- Subsection (c) outlines requirements concerning the plan update's content, including an overview of necessary components for the update's planning process, risk assessment, mitigation strategy, plan maintenance, and overall process documentation.
- Subsection (d) outlines the steps and agencies required for proper review of the plan before finished plans are adopted by their respective communities.[5]

[3] Code of Federal Regulations, Chapter 44. Section 201.6, subsection (a), 2010

[4] ibid, subsection (b). 2010

[5] ibid, subsection (c). 2010

The Natural Hazard Mitigation Plan must be submitted to Oregon's Office of Emergency Management (OEM) for initial plan review, and then it is submitted to FEMA for review and federal approval.[6] Once FEMA provides the Approved Pending Adoption letter, the local jurisdictions must approve the NHMP. Once the local jurisdictions have provided resolutions showing the adoption of the NHMP, FEMA will send the approval letter with the dates of the NHMP approval. The approval period is for five years.

Additionally, the Emergency Management Performance Grant (EMPG), which helps fund local emergency management programs, also requires a FEMA-approved NHMP.

What is the Policy Framework for Natural Hazards Planning in Oregon?

Planning for natural hazards is an integral element of Oregon's statewide land use planning program, which began in 1973. All Oregon cities and counties have comprehensive plans and implementing ordinances that are required to comply with the Statewide Planning Goals. The challenge faced by state and local governments is to keep this network of local plans coordinated in response to the changing conditions and needs of Oregon communities.

Statewide Planning Goal 7, Areas Subject to Natural Hazards, calls for local plans to include inventories, policies and ordinances to guide development in or away from hazard areas. Goal 7, along with other land use planning goals, has helped to reduce losses from natural hazards. Through risk identification and the recommendation of risk-reduction actions, this NHMP aligns with the goals of the jurisdictions' comprehensive plans, and helps each jurisdiction meet the requirements of Goal 7.

The primary responsibility for the development and implementation of risk reduction strategies and policies lies with local jurisdictions. However, resources exist at the state and federal levels. Some of the key agencies in this area include OEM, Oregon Building Codes Division (BCD), Oregon Department of Forestry (ODF), Oregon Department of Geology and Mineral Industries (DOGAMI), and the Department of Land Conservation and Development (DLCD).

How was the Plan Developed?

The Umatilla County NHMP Steering Committee, with the collaboration of DLCD staff, is updating the *2014 Umatilla County NHMP* which expired in 2019. The *2021 Umatilla County NHMP* is the result of an extraordinary collaboration. DLCD led the Umatilla County NHMP Steering Committee through the NHMP update process. Umatilla County, the twelve incorporated cities, and four special districts (identified as plan holders because they have signed IGAs with DLCD) collaborated with many others to update to the expired *2014 Umatilla County NHMP*. This *2021 Umatilla County NHMP* is the result of a substantial collaborative effort between DLCD, Umatilla County, and all participating organizations (plan holders and others). Partners are plan holders are those organizations or jurisdictions that signed IGAs with DLCD for the work on the NHMP. These plan holders are Umatilla County, Adams, Athena, Echo, Helix, Hermiston, Milton-Freewater, Pendleton,

[6] ibid, subsection (d). 2010

Pilot Rock, Stanfield, Ukiah, Umatilla, Weston, Hermiston Irrigation District, Stanfield Irrigation District, Umatilla Soil and Water Conservation District, and the Walla Walla River Irrigation District.

Other partner organizations include: Federal Emergency Management Agency, Oregon Office of Emergency Management, Oregon Climate Change Research Institute, National Weather Service, USDA-Umatilla National Forest, Oregon Department of Forestry, Clearview Disability Resource Center, Confederated Tribes of the Umatilla Indian Reservation, U.S. Army Corps of Engineers, Greater Easter Oregon Development Corporation, Oregon Energy Trust, Umatilla County Fire District #1, East Umatilla Fire & Rescue District, Walla Walla Basin Watershed District, and the Milton-Freewater Water Control District.

A roster of the NHMP Steering Committee is included in the Acknowledgements section of this NHMP. The Umatilla County NHMP Steering Committee formally convened at six meetings via Zoom (September 29, 2020; October 27, 2020, November 17, 2020; December 15, 2020; January 26, 2021; and February 23, 2021) with the DLCD Natural Hazards Planner, to discuss and revise the NHMP. In addition, the DLCD Natural Hazards Planner called and emailed with the Planning Director and the Emergency Manager for continued discussion throughout the process.

Steering Committee members contributed data and information, did outreach and advocacy for the NHMP, and reviewed and updated the NHMP in collaboration with DLCD.

An open public involvement process is essential to the development of an effective NHMP. To develop a comprehensive approach to reducing the effects of natural disasters, the planning process includes opportunity for the public, neighboring communities, local and regional agencies, as well as, private and non-profit entities to comment on the plan during review.[7] Umatilla County, the Cities, the Special Districts, and other partners maintained a publicly accessible website throughout the planning process and provided opportunities for the general public to provide feedback. In addition, there were flyers made and distributed about the NHMP, and outreach at events. See Appendix A Planning and Public Process for additional details.

How is the Plan Organized?

Each volume of the NHMP provides specific information and resources to assist readers in understanding the hazard-specific issues facing county and city residents, businesses, and the environment. Combined, the sections work in synergy to create a NHMP that furthers the community's mission to reduce or eliminate risk to people and their property from hazards and their effects. This NHMP structure enables stakeholders to use the section(s) of interest to them; see the Table of Contents in addition to the descriptions below. See the Acknowledgements for a detailed list of participating organizations and their representatives. See Appendix A Planning and Public Process for more information about outreach.

Cover and Front Pages

The cover and the front pages orient the reader of the NHMP to what the NHMP contains.

- A new NHMP cover was created. The photos for the cover were taken by Umatilla County, Cities, and Special Districts staff. Photos were also added to the Volume I, II, and III covers.

[7] Code of Federal Regulations, Chapter 44. Section 201.6, subsection (b), 2010.

- The FEMA Approval Pending Adoption (APA) and final approval letter as well as the County, Cities, and Special Districts resolutions of adoption are included (when available).
- The Acknowledgements have been updated to include the 2021 Umatilla County NHMP Steering Committee members.
- The Table of Contents has been updated.

Volume I: Basic Plan

Executive Summary

The executive summary provides an overview of the FEMA requirements plans process and highlights the key elements of the risk assessment, mitigation strategy and implementation and maintenance strategy.

Section 1: Introduction

The Introduction briefly describes the countywide mitigation planning efforts and the methodology used to develop the plan.

Section 2: Risk Assessment

Section 2 provides the factual basis for the mitigation strategies contained in Section 3. Additional information is included within Appendix B, Community Profile, which contains an overall description of Umatilla County and the Cities as well as Special Districts.

The Risk Assessment section includes a brief description of community sensitivities and vulnerabilities and an overview of the natural hazards further addressed in Volume II Hazard Annexes. Climate change is discussed in the Risk Assessment, the Hazard Annexes, and Appendix E.

The Risk Assessment allows readers to gain an understanding of Umatilla County's, and other jurisdictions', sensitivities – those community assets and characteristics that may be impacted by natural hazards, as well as the County's, and other jurisdictions', resilience – the ability to manage risk and adapt to hazard event impacts. Information on the jurisdictions' participation in the National Flood Insurance Program (NFIP) is included, with additional details in the Flood Annex.

Section 3: Mitigation Strategy

This section documents the plan vision, mission, goals, and actions and describes the components that guide implementation of the identified mitigation strategies. Mitigation actions are based on community sensitivity and resilience factors and the hazard assessments in Section 2 Risk Assessment and Volume II Hazard Annexes. In Section 3, there are two tables related to mitigation actions: Table 3-1 Umatilla County 2021 NHMP Mitigation Actions and Table 3-2 Umatilla County Mitigation Actions 2014 Status.

Section 4: Plan Implementation and Maintenance

This section provides information on the implementation and maintenance of the plan. It describes the process for prioritizing projects, and includes a suggested list of tasks for updating the plan to be completed at the semi-annual and five-year review meetings. There is a five-year update cycle for the NHMP. As part of this NHMP process, the NHMP will be reviewed and discussed twice per year at plan maintenance meetings. This will help ensure the NHMP is used and stays connected to the

plans, policies, and programs of the involved jurisdictions and other Steering Committee members. The Emergency Management Performance Grant (EMPG) requires NHMP review twice per year.

Volume II: Hazard Annexes

The hazard annexes describe the risk assessment process and summarize the best available local hazard data. A hazard summary is provided for each of the hazards addressed in the plan. The summary includes hazard history, location, extent, vulnerability, impacts, and probability.

The hazard specific annexes included with this NHMP are the following:

- Floods;
- Air Quality;
- Severe Summer Storms;
- Severe Winter Storms (combined with Severe Summer Storms);
- Wildfire;
- Drought
- Earthquakes;
- Volcanoes, and
- Landslides/Debris Flows.

Volume III: Mitigation Resources

The resource appendices are designed to provide the users of the *2021 Umatilla County Natural Hazards Mitigation Plan* with additional information to assist them in understanding the contents of the mitigation plan, and provide them with potential resources to assist with plan implementation.

Appendix A: Planning and Public Process

This appendix includes documentation of all the countywide public processes utilized to update the plan. It includes invitation lists, meeting agendas, sign-in sheets, screen shots from websites, and copies of flyers, as well as any other public involvement methods.

Appendix B: Community Profile

The community profile describes the Umatilla County, Cities, Special Districts, and others from a number of perspectives to help define and understand the regions sensitivity and resilience to natural hazards. The information in this section represents a snapshot in time of the current sensitivity and resilience factors in the region when the plan was updated. Sensitivity factors can be defined as those community assets and characteristics that may be impacted by natural hazards, (e.g., special populations, economic factors, and historic and cultural resources). Community resilience factors can be defined as the community's ability to manage risk and adapt to hazard event impacts (e.g., governmental structure, agency missions and directives, and plans, policies, and programs). This appendix has been greatly updated from the *2014 Umatilla County NHMP*.

Appendix C: Economic Analysis of Natural Hazard Mitigation Projects

This appendix describes FEMA's requirements for benefit/cost analysis in natural hazards mitigation, and two other approaches: the cost effectiveness and the STAPLE/E. This appendix has been retained and modified from *2014 Umatilla County NHMP*.

Appendix D: Grant Programs and Resources

This appendix lists state and federal resources and programs by hazard. It has been greatly updated from the *2014 Umatilla County NHMP*.

Appendix E: Future Climate Projections Reports

This appendix includes one report and one informational flyer provided by the Oregon Climate Change Research Institute (OCCRI): *Future Climate Projections Umatilla County: A Report to the Oregon Land Conservation and Development* and the U*matilla County Future Projections Two-Pager*. The report is dated October 2020 and the flyer was done in January 2021. These documents were funded by DLCD using a small portion of the HMGP DR-3244 grant funds obtained by DLCD. This is a new appendix.

Appendix F: Umatilla County NHMP Hazards Maps Details

A large majority of the maps located in the *2021 Umatilla County NHMP* were created by Umatilla County Land Use Planning. There are a total of 30 maps covering natural hazards, utilities, cropland and more. A handful of maps were created through open-source online mapping programs. Many datasets used to create this map were either generated by Umatilla County or were obtained by Umatilla County from other agencies. This is a new appendix.

Appendix G: Umatilla County NHMP Success Stories

These are stories that illustrate when a community in Umatilla County identifies a problem or concern and then works to solve it. These stories were identified and provided by the members of the Umatilla County NHMP Steering Committee. This is a new appendix.

Appendix H: Umatilla County NHMP Natural Hazards Outreach Calendar

This calendar will be used each year to focus outreach and education efforts on natural hazards on a month by month basis. It relates to short-term multi-hazard mitigation action #2 in the *2021 Umatilla County NHMP*. See Table 3-1, 2021 Umatilla County NHMP Mitigation Actions for the mitigation actions. This is a new appendix.

Appendix I: Umatilla County Community Wildfire Protection Plans

To reduce the impact of wildfire, Umatilla County has three Community Wildfire Protection Plans (CWPP): the *West County CWPP* (2006), the *Blue Mountains and Foothills Region CWPP* (2005), and the *Mill Creek and Walla Walla County CWPP* (2017). The CWPPs provide detailed information on the vulnerability and history of wildfire in the County, and provide mitigation actions the County can implement to reduce the impact of wildfire. This *2021 Umatilla County NHMP* links to the CWPPs as it also contains wildfire information and mitigation actions. See Table 3-1, Umatilla County NHMP Mitigation Actions.

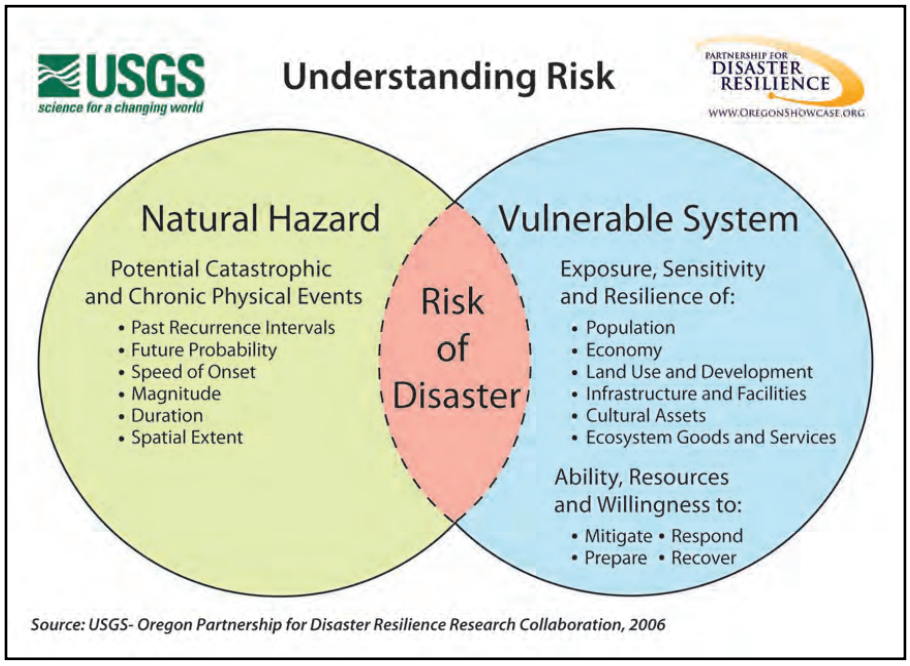
Section 2:
Risk Assessment

This section of the NHMP addresses 44 CFR 201.6(b)(2) - Risk Assessment. In addition, this chapter can serve as the factual basis for addressing Oregon Statewide Planning Goal 7 – Areas Subject to Natural Hazards. Assessing natural hazards risk has three phases:

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places, and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The information presented in this Risk Assessment, along with hazard specific information in Volume II Hazard Annexes and the other information in the appendices, is provided as the basis for the mitigation actions in Section 3 Mitigation Strategy in Table 3-1. Figure 2-1 graphically depicts one way to understand risk. Ultimately, the goal of hazard mitigation is to reduce the area where hazards and vulnerable systems overlap, which is the area called the risk of disaster.

Figure 2-1 Understanding Risk

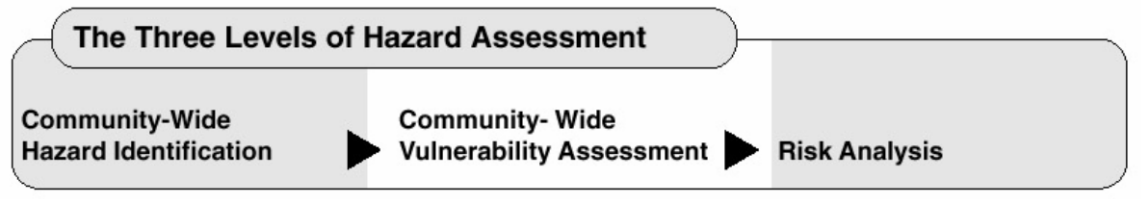


Source: USGS and Oregon Partnership for Disaster Resilience, 2006.

What is a Risk Assessment?

A risk assessment consists of three phases: hazard identification, vulnerability assessment, and risk analysis, as illustrated in the following graphic.

Figure 2-2 Three Phases of a Risk Assessment



Source: *Planning for Natural Hazards: Oregon Technical Resource Guide*, 2001

This three-phase approach to developing a risk assessment is conducted sequentially because each phase builds upon data from prior phases. However, gathering data for a risk assessment need not occur sequentially.

The first phase, **hazard identification**, involves the identification of the geographic extent of a hazard, its intensity, and its probability of occurrence. This level of assessment typically involves producing a map. The outputs from this phase can also be used for land use planning, management, and regulation; public awareness; defining areas for further study; and identifying properties or structures appropriate for acquisition or relocation.[1]

The second phase, **vulnerability assessment**, combines the information from the hazard identification with an inventory of the existing (or planned) property and population exposed to a hazard, and attempts to predict how different types of property and population groups will be affected by the hazard. This step can also assist in justifying changes to building codes or development regulations, property acquisition programs, policies concerning critical and public facilities, taxation strategies for mitigating risk, and informational programs for members of the public who are at risk.[2]

The third phase, **risk analysis**, involves estimating the damage, injuries, and costs likely to be incurred in a geographic area over a period of time. Risk has two measurable components: (1) the magnitude of the harm that may result, defined through the vulnerability assessment, and (2) the likelihood or probability of the harm occurring. An example of a product that can assist communities in completing the risk analysis phase is HAZUS, a risk assessment software program for analyzing potential losses from floods, hurricane winds and earthquakes. In Hazards U.S. – Multi-Hazard (HAZUS-MH) current scientific and engineering knowledge is coupled with the latest geographic information systems (GIS) technology to produce estimates of hazard-related damage before, or after a disaster occurs.

[1] Burby, R. 1998. *Cooperating with Nature*, Washington, DC: Joseph Henry Press, 126, https://www.nap.edu/catalog/5785/cooperating-with-nature-confronting-natural-hazards-with-land-use-planning

[2] Burby, R. 1998. *Cooperating with Nature*, Washington, DC: Joseph Henry Press, 133, https://www.nap.edu/catalog/5785/cooperating-with-nature-confronting-natural-hazards-with-land-use-planning

NHMP Planning Area

44 CFR 201.6(c)(2)(iii) – Multi-jurisdictional Risk Assessment: The Risk Assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area . . .

This is a multi-jurisdictional NHMP. The planning area for the *2021 Umatilla County NHMP* is Umatilla County, both unincorporated and incorporated areas. The jurisdictions of Umatilla County, the twelve incorporated cities, and four special districts are included in this NHMP as partners that are plan holders. The cities are: Adams, Athena, Echo, Helix, Hermiston, Milton-Freewater, Pendleton, Pilot Rock, Stanfield, Ukiah, Umatilla, and Weston. The special districts are: Walla Walla River Irrigation District, Stanfield Irrigation District, Hermiston Irrigation District, and Umatilla County Soil and Water Conservation District. The partners that are plan holders are those organizations or jurisdictions that signed IGAs with DLCD for the work on the NHMP. There are many other partners that participated in the work on the *2021 Umatilla County NHMP*. All the partners are listed in the Special Thanks and Acknowledgements section of the *2021 Umatilla County NHMP*.

Of note, the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) is a federally recognized sovereign tribal government and partner that participated on the Umatilla County NHMP Steering Committee and is a partner on many of the mitigation actions. CTUIR is located within Umatilla County and has a separate NHMP; therefore, CTUIR is not a plan holder.

In the *2014 Umatilla County NHMP*, the Cities of Adams, Pilot Rock, and Umatilla participated and were included; they had separate jurisdictional addenda. In the *2021 Umatilla County NHMP*, information from the jurisdictions and special districts is integrated and included in the main body of the NHMP; there are no separate jurisdictional addenda. Within the NHMP, jurisdictions and special districts are called out in specific places as applicable. Information provided in this Risk Assessment section is supplemented by the Hazard Annexes, Appendix E Umatilla County Future Climate Projections Report and Appendix F Umatilla County NHMP Hazards Maps Details. A lengthier description of the contents of the *Future Climate Projections Umatilla County* is included in the Hazard Identification section below and in the Introduction to the Hazard Annexes.

Hazard Identification

Umatilla County identifies nine natural hazards that could impact on the County. These hazards include drought, earthquake, flood, landslide/debris flow, volcano, wildfire, severe summer storms, severe winter storms, and air quality. At the Umatilla County NHMP Steering Committee meeting on October 27, 2020, the DLCD Natural Hazards Planner led the group in an exercise called the Hazard Vulnerability Analysis or Assessment (HVA); the results are discussed in more detail later in this Risk Assessment.

Table 2-1 categorizes the hazards identified by Umatilla County and compares it to the regional hazards identified in the *2020 Oregon Natural Hazard Mitigation Plan* for the Mid-Columbia Region (Region 5). Region 5 includes Umatilla, Morrow, Gilliam, Sherman, Wasco, and Hood River Counties.

Table 2-1 Umatilla County NHMP and Oregon NHMP Hazard Identification

Hazard Identified in Umatilla County NHMP*	Hazard identified in Oregon NHMP**
Severe Winter Storms	Winter Storms
Severe Summer Storms	Wind Storms
Earthquakes	Earthquakes

Droughts	Droughts
Floods	Floods
Volcanoes	Volcanoes
Wildfire	Wildfire
Landslides/Debris Flows	Landslides
Air Quality (added in 2020)	NA
NA	Extreme Heat

Source: *Umatilla County NHMP Steering Committee, 2020-21, ***2020 Oregon NHMP*, Region 5: Mid-Columbia Region, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_11_RA5.pdf

This Hazard Identification section includes descriptions for each natural hazard in the following ways: significant changes since the *2014 Umatilla County NHMP*, characteristics, and the location/extent. For additional details on the history of events for each hazard, the relationship with climate projections, and maps of the hazards, see Volume II Hazard Annexes and Appendix E.

As part of the NHMP update process, there is a requirement to examine changes in development. Climate change and climate resilience are important parts of this discussion. The climate is changing and the impacts becoming more evident in both quantitative and qualitative information. According to the UN Intergovernmental Panel on Climate Change (IPCC), climate resilience is defined as "the capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation."[3]

In Appendix E Umatilla County Future Climate Projections Report, the Oregon Climate Change Research Institute's (OCCRI) *Future Climate Projections Umatilla County: A Report to the Oregon Department of Land Conservation and Development* provides important information regarding the influence and impacts of climate change on existing natural hazards events such as heavy rains, river flooding, drought, heat waves, cold waves, wildfire, and air quality. OCCRI's research and analysis focuses on how climate change is expected to influence natural hazards. It also describes results for the natural hazards using climate metrics in summary and as a comparison.

The report describes county-specific projected changes in climate metrics related to selected natural hazards. The reports present future climate projections for the 2020s (2010-2039 average) and the 2050s (2040-2069 average) compared to the 1971-2000 average historical baseline. Each hazard in the report has a box highlighting "key messages" that call out the main points of the research and analysis for that hazard. There is a very useful table that is a "summary of projected direction of change along with level of confidence in climate change-related risk of natural hazard occurrence." The Introduction of the Hazard Annexes also has climate change information in the "Predicted Climate Variability**"** section. The Umatilla County specific summary of expected climate change impacts is in Table HA-2 in the Introduction to the Hazards Annexes.

The Hazard Vulnerability Analysis/Assessment and the analysis of risk are included after the Hazard Identification of this Risk Assessment. This analysis covers all of the identified natural hazards in a relatively brief manner. Note that Table 2-7 Critical / Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers, identifies the critical facilities, critical infrastructure, and vulnerable

[3] International Panel on Climate Change (IPCC), *Climate Resilience*, 2014, page 1772.

population centers of Umatilla County, the twelve incorporated cities of Umatilla County, and the four special districts. For a more detailed assessment of the hazard-specific vulnerability, see Volume II Hazard Annexes.

Region 5 includes Umatilla, Morrow, Gilliam, Sherman, Wasco, and Hood River Counties, as described in the *2020 Oregon Natural Hazards Mitigation Plan*.

> "Region 5 is largely rural, with urban development occurring in communities along I-84 in Hood River and Umatilla Counties. Manufactured homes, which are inherently more vulnerable to natural hazards, make up a significant share of the region's housing units. Over 80% of homes in Gilliam and Sherman Counties were built before 1990 and current seismic building standards. With the exception of Morrow and Umatilla Counties where FIRMs were updated in 2007 and 2010 respectively, the region's FIRMs date from the 1980's. A FEMA Risk MAP project is underway to update the Middle Columbia Hood watershed flood maps in Hood River, Sherman and Wasco Counties."[4] Floodplain mapping efforts are also underway in Umatilla County.

Federal Disaster and Emergency Declarations

Looking at the past events that have occurred in Umatilla County can provide a general sense of the hazards that have caused significant damage in the County. Where trends emerge, disaster declarations can help inform hazard mitigation project priorities.

President Dwight D. Eisenhower approved the first federal disaster declaration in May 1953 following a tornado in Georgia. Since then, federally declared disasters have been approved within every state as a result of natural hazard related events. When governors ask for presidential declarations of major disaster or emergency, they stipulate which counties in their state they want included in the declaration.

A Major Disaster Declaration provides a wide range of federal assistance programs for individuals and public infrastructure, including funds for both emergency and permanent work. An Emergency Declaration is more limited in scope and without the long-term federal recovery programs of a Major Disaster Declaration. Generally, federal assistance and funding are provided to meet a specific emergency need or to help prevent a major disaster from occurring. Fire Management Assistance is provided after a State submits a request for assistance to the Federal Emergency Management Agency (FEMA) Regional Director at the time a "threat of major disaster" exists.

As of January 2021, FEMA has approved a total of 38 federal major disaster (DR) declarations, 4 emergency (EM) declarations and 57 fire management assistance (FM) declarations in Oregon. There are also 36 Fire Suppression Authorizations (FSA) on record for Oregon. Counting all types of disaster declarations (DR, EM, FM and FSA), the total number of disasters in Oregon is 135 as identified in the FEMA "Disaster Declarations by State/Tribal Government" list on their website[5]

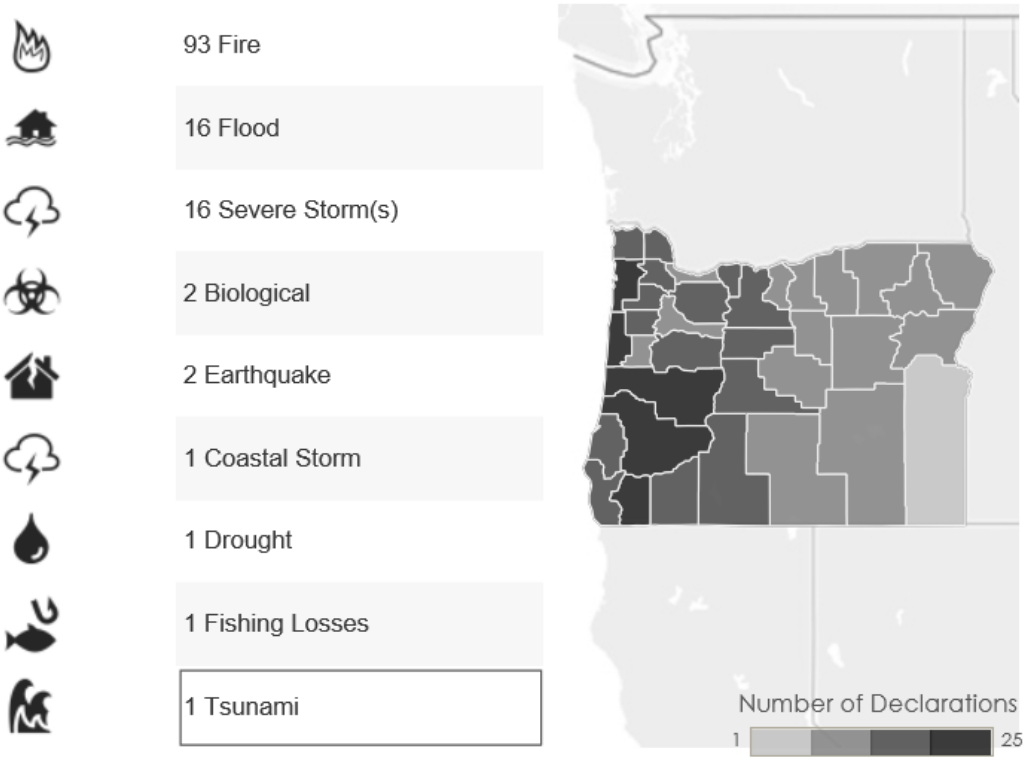
However, this contrasts with the 133 declared disasters since 1953 that FEMA has listed for Oregon on their state by state "Historical Disaster Data" website. The "Historical Disaster Data" website includes

[4] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, Region 5 Risk Assessment, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_11_RA5.pdf

[5] FEMA, *Declared Disasters, Oregon,* https://www.fema.gov/disasters/disaster-declarations?field_dv2_state_territory_tribal_value=OR&field_year_value=1996&field_dv2_declaration_type_value=All&field_dv2_incident_type_target_id_selective=All, accessed 12/29/20;

the graphic shown in Figure 2-3, illustrating the types of disasters and the location in Oregon, by county, of the disasters.[6] DLCD staff are not able to explain this discrepancy in the FEMA data.

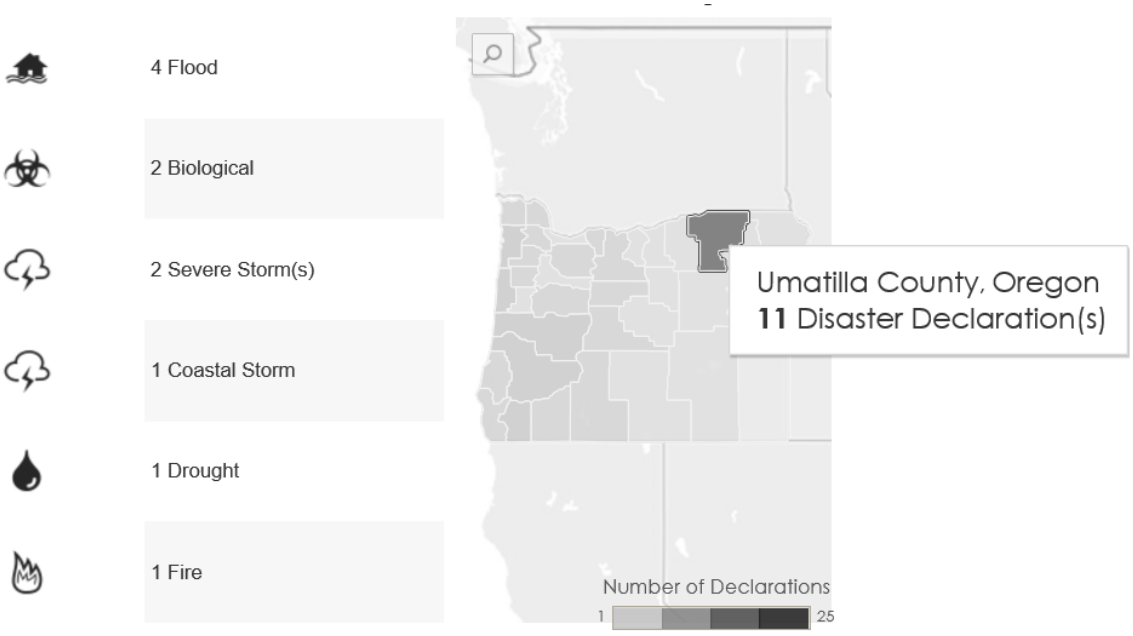
Figure 2-3 Disaster Declarations in Oregon Since 1953



Source: FEMA, https://recovery.fema.gov/state-profiles/HistoricalDisasterData, most recently accessed 12/29/20

[6] FEMA, *Declared Disasters, Oregon,* https://www.fema.gov/disasters/disaster-declarations?field_dv2_state_territory_tribal_value=OR&field_year_value=1996&field_dv2_declaration_type_value=All&field_dv2_incident_type_target_id_selective=All, accessed 12/29/20;

Figure 2-4 Disaster Declarations in Umatilla County Since 1953



Source: FEMA, https://recovery.fema.gov/state-profiles/HistoricalDisasterData, most recently accessed 12/29/20

Figure 2-4, shown above, uses the Historical Disaster Data information as a visual for the disaster declarations in Umatilla County. According to the Historical Disaster Data, there have been 11 disaster declarations in Umatilla County. In Table 2-2, there are 11 disaster declarations listed. According to the Disaster Declarations information there have been seven major disaster (DR) declarations, three emergency declarations (EM), and one fire management assistance (FM) declaration for Umatilla County. Table 2-2 summarizes the FEMA disaster declarations declared in Oregon that have directly affected Umatilla County since 1953; this table uses the Disaster Declarations information as noted in the source listed under the table.[7]

[7] FEMA, *Declared Disasters, Oregon,* https://www.fema.gov/disasters/disaster-declarations?field_dv2_state_territory_tribal_value=OR&field_year_value=1996&field_dv2_declaration_type_value=All&field_dv2_incident_type_target_id_selective=All, accessed 12/29/20 and 1/5/21; FEMA, https://recovery.fema.gov/state-profiles/HistoricalDisasterData, accessed 12/29/20 and 1/5/21

Table 2-2 FEMA Major Disaster, Emergency, and Fire Management Declarations for Umatilla County

Declaration Number	Declaration Date	Incident Period	Incident/Type of Damages	Individual Assistance	Public Assistance Categories
DR-4519	April 3, 2020	February 5-9, 2020	Severe Storms, Flooding, Landslides, and Mudslides	DR-4519 provides IA & PA funds.	DR-4519 provides IA & PA funds.
DR-4499	March 28, 2020	January 20, 2020 - ongoing	Covid-19 Pandemic	DR-4499 does not provide IA funds.	DR-4499 provides PA funds.
EM-3429	March 13, 2020	January 20, 2020 - ongoing	Covid-19 Pandemic	The status of IA or PA funds is not listed.	The status of IA or PA funds is not listed.
DR-4452	July 9, 2019	April 6-21, 2019	Severe Storms, Flooding, Landslides, and Mudslides	DR-4452 does not provide IA funds.	DR-4452 provided PA funds.
EM-3228	Sep. 7, 2005	Aug. 29 to Oct. 1, 2005	Hurricane Katrina evacuation	None	B
DR-1510	Feb. 19, 2004	Feb. 26, 2003 to Jan. 14, 2004	Severe winter storm	None	A, B, C, D, E, F, G
FSA-2375	Aug. 15, 2001	Aug. 15, 2001 to Aug. 19, 2001	Oregon Bridge Creek Fires	No info	No info
DR-1160	Jan. 23, 1997	Dec. 25, 1996 to Jan. 6, 1997	Severe winter storm/flooding	None	A, B, C, D, E, F, G
EM-3039	Apr. 29, 1977	Apr. 29, 1977	Drought	None	A, B
DR-184	Dec. 24, 1964	Dec. 24, 1964	Heavy rains and flooding	Yes	A, B, C, D, E, F, G
DR-1099	Feb. 9, 1996	Feb. 4, 1996 to Feb. 21, 1996	High winds, severe storms, and flooding	No info	No info

Source: FEMA, *Declared Disasters, Oregon,* https://www.fema.gov/disasters/disaster-declarations?field_dv2_state_territory_tribal_value=OR&field_year_value=1996&field_dv2_declaration_type_value=All&field_dv2_incident_type_target_id_selective=All, accessed 12/29/20; FEMA, https://recovery.fema.gov/state-profiles/HistoricalDisasterData, accessed 12/29/20

Drought

Significant changes since 2014 NHMP

In the *2014 Umatilla County NHMP*, drought was not ranked in the risk scores of the nine natural hazards. In the Hazard Vulnerability Analysis (HVA) for the *2021 Umatilla County NHMP*, the Steering Committee awarded 184/240 possible points for drought, making it the sixth ranked natural hazard out of the nine identified natural hazards (removed weather emergencies and added air quality).

Characteristics

Droughts are common in Oregon, especially in eastern Oregon. They occur in all parts of the state in both summer and winter months. Droughts are recurring and they can have a profound effect on the economy, particularly the hydropower and agricultural sectors. The financial impact of which affects the economic stability of the county.

The environmental consequences also are far-reaching. They include insect infestations in forests and the lack of water to support endangered fish species. In recent years, the State of Oregon has addressed drought emergencies through the Oregon Drought Council. This interagency (state/federal) council meets to discuss forecasts and to advise the Governor as the need arises.

The Oregon State University Extension Service published a report in June 1979 following the 1977 drought (EM-3039) (listed in Table 2-2 above). Highlights of the survey findings indicate that the 1977 drought affected 80% of ranches in eastern Oregon, decreased forage, increased purchase of feed, reduced rate of gain of cattle, delayed breeding, herd health problems and increased water hauling and equipment investments[8]. While this report is several decades old, the findings remain current because droughts remain as impactful events in counties across Oregon.

Location/Extent

The extent of drought events depends upon the degree of moisture deficiency, and the duration and size of the affected area. Typically, droughts occur as regional events and often affect more than one city and county. Umatilla County is susceptible to droughts because of its location east of the Cascades. The region experiences dry conditions annually during the summer months from June to September.

Umatilla County has a history of many drought events according to the Significant Historic Hazard Events Tables in Table DR-1 within the Volume II Drought Annex of this NHMP. The table notes the dates, locations, and a description of the event, identifying if there was a disaster declaration related to it. For more information see the Drought Annex in Volume II Hazard Annexes.

According to OCCRI's *Future Climate Projections* report, "Drought conditions, as represented by low summer soil moisture, low spring snowpack, low summer runoff, and low summer precipitation are projected to become more frequent in Umatilla County by the 2050s relative to the historical baseline." OCCRI's report presents future changes "in five variables indicative of drought conditions—low spring snowpack, low summer soil moisture, low summer runoff, low summer precipitation, and high summer evaporation—in terms of a change in the frequency of the historical baseline 1-in-5 year event (that is, an event having a 20% chance of occurrence in any given year)." See Appendix E for more information.

[8] Oregon State University Extension Services, *Effects of the 1977 Drought on Eastern Oregon Ranches* (1979), excerpted from the *2013 Lake County NHMP*.

Earthquake

Significant changes since 2014 NHMP

In the *2014 Umatilla County NHMP*, earthquakes were ranked in fourth place, with five of the nine hazards having no score. In the HVA for the *2021 Umatilla County NHMP*, earthquakes were ranked in seventh place out of nine hazards (removed weather emergencies and added air quality).

Characteristics

Oregon and the Pacific Northwest are susceptible to earthquakes from these sources: 1) shallow crustal events within the North American Plate; 2) deep intra-plate events within the subducting Juan de Fuca Plate; 3) the off-shore Cascadia Subduction Zone; and 4) earthquakes associated with renewed volcanic activity.[9]

The Cascadia Subduction Zone and the subduction process is responsible for most of the earthquakes in the Pacific Northwest as well as for creating the volcanoes in the Cascades. Researchers recently calculated the likelihood of a Magnitude 8 to 9 Cascadia Subduction Zone earthquake at 37% over the next 50 years.[10] The last such event occurred in January of 1700, causing a tsunami in Japan. See the Earthquake Annex in Volume II.

Umatilla County has not experienced damaging earthquakes in recent history. Primary earthquake hazards include ground shaking amplification, liquefaction, and earthquake-induced landslides.

Location/Extent

The areas most susceptible to ground amplification and liquefaction have young, soft alluvial sediments, found along river and stream channels. The extent of the damage to structures and injury and death to people will depend upon the type of earthquake, proximity to the epicenter and the magnitude and duration of the event. Buildings, dams, levees and lifelines including water, sewer, stormwater and gas lines, transportation systems, and utility and communication networks are particularly at risk. Also, damage to roads, bridges and water systems will make it difficult to respond to post-earthquake fires.

In Volume II Hazard Annexes, the Earthquake Annex has earthquakes identified in Table EQ-1, Significant Historic Hazard Events. The table notes the dates, locations, and a description of the event, identifying if there was a disaster declaration related to it. For more information on the earthquake hazard in Umatilla County see the Earthquake Annex in Volume II Hazard Annexes.

Earthquake was not one of the identified climate change metrics therefore OCCRI's *Future Climate Projections* report does not include information about earthquakes. See the Earthquake Annex for more information.

[9] DLCD, OPDR, *Planning for Natural Hazards: Oregon Technical Resource Guide*, https://oregonexplorer.info/content/planning-natural-hazards-oregon-technical-resource-guide.

[10] Oregon Seismic Safety Policy Advisory Commission (OSSPAC), *The Oregon Resilience Plan: Reducing Risk and Improving Recovery for the Next Cascadia Earthquake and Tsunami, Report to the 77th Legislative Assembly*, February 2013, https://www.oregon.gov/oem/documents/oregon_resilience_plan_final.pdf

Flood

Significant changes since 2014 NHMP

In the *2014 Umatilla County NHMP*, floods were ranked in third place out of the nine natural hazards. Five of the hazards had no score. In the *2021 Umatilla County NHMP*, floods are ranked in first place, with 240/240 points. There are nine hazards (removed weather emergencies and added air quality) in the *2021 Umatilla County NHMP*.

Characteristics

The principal types of flood that occur in Umatilla County include riverine floods. Flash floods can also occur. The Columbia River and Umatilla River, and their tributaries, are the primary sources of flooding.

Riverine Flooding

Riverine floods occur when water levels in rivers and streams overflow their banks. Most communities located along such water bodies have the potential to experience this type of flooding after spring rains, heavy thunderstorms or rapid runoff from snow melt. Riverine floods can be slow or fast-rising, but usually develop over a period of days. The danger of riverine flooding occurs mainly during the winter months, with the onset of persistent, heavy rainfall, and during the spring, with melting of snow.

Local Flash Floods

Summer thunderstorms are common throughout the region. During these events, normally dry gulches can quickly become raging torrents, a flash flood. Flash floods are most common to Eastern Oregon. This is because summer temperatures are much higher east of the Cascades and thunderstorms are common during the summer months. Although flash flooding occurs throughout Oregon, local geology in the region can increase the impact of this hazard.

Location/Extent

The most significant of the FEMA-determined floodplains and floodways surround the Columbia, Walla Walla, and Umatilla Rivers, and their tributaries. Each of the twelve incorporated cities in Umatilla County have at least a portion of the community located adjacent to one of the major rivers or tributary channels, and each one has a mapped floodplain. Properties in and near the floodplains in the cities of Pendleton and Echo, as well as unincorporated areas of Umatilla County, are most subject to flooding events. Cities and unincorporated areas are also affected by flood runoff from the relatively steep mountains surrounding the cities and unincorporated areas. As discussed by the Umatilla County NHMP Steering Committee, in addition to floods, erosion and channel migration are related hazards of concern.

In Volume II Hazard Annexes, the Flood Annex has floods identified in Table FL-5, Significant Historic Hazard Events. The table note the dates, locations, and a description of the event, identifying if there was a disaster declaration related to it. For more information on the flood hazard in Umatilla County see the Flood Annex in Volume II Hazard Annexes.

Flood is one of the identified climate change metrics in OCCRI's *Future Climate Projections* report. The OCCRI report provides description of the present with a look at two future emissions scenarios, RCP 4.5 and RCP 8.5.

> "The projected change in the mean monthly hydrograph of the Columbia River at McNary is shown in Figure 12 and of the Umatilla River at Pendleton is shown in Figure 13. On the Columbia River at McNary, the monthly hydrograph is characteristic of a snow-dominated basin with peak flows during the late spring snowmelt season (Figure 12). On the Umatilla River at

McKay, the monthly hydrograph is characteristic of a mixed rain-snow basin with peak flows during the early to mid-spring snowmelt season and a smaller peak in late fall to early winter reflecting rainfall contributions early in the water year (Figure 13). By the 2050s (2040–2069), under both emissions scenarios, the peak streamflow in both rivers is projected to shift earlier in the spring as warmer temperatures cause the snowpack to melt earlier. In addition, winter streamflow is projected to increase due to increased winter precipitation and that precipitation falling more as rain than snow."[11]

See the Introduction to the Hazard Annexes and Appendix E for more information on climate change.
See the Flood Annex and Appendix E for more information about floods.

Landslide

Significant changes since 2014 NHMP

In the *2014 Umatilla County NHMP*, landslides were not scored and thus unranked in the list of nine hazards. In the *2021 Umatilla County NHMP*, the Steering Committee ranked landslides ninth out of nine hazards (removed weather emergencies and added air quality).

Characteristics

While not all landslides result in private property damage, many landslides impact transportation corridors, fuel and energy conduits, and communication facilities. They can pose a serious threat to human life. "Landslides lead to an estimated 25–50 deaths per year in the United States (Spiker and Gori, 2003). In Oregon, the average annual loss of life is estimated to be nearer to one or two lives per year (Beaulieu and Olmstead, 1999)."[12]

As described in *Preparing for Landslide Hazards: A Land Use Guide for Oregon Communities*," The general term *landslide* refers to a range of slope movement processes including rock falls, debris flows, earth slides, and other mass movements (Varnes, 1978). The main triggers of landslides are precipitation, earthquakes, and human activity."[13] In addition,

> "All landslides can be classified into six types of movement: 1) falls, 2) topples, 3) slides, 4) spreads, 5) flows, and 6) complex. Most slope failures are complex combinations of these six distinct types, but the generalized groupings provide a useful means for framing discussion of the type of hazard and potential mitigation actions. Movement type should be combined with other landslide characteristics such as type of material, rate of movement, depth of failure, and water content to understand more fully the landslide behavior. For a more complete description of the different types of landslides, see *U.S. Transportation Research Board Special Report 247, Landslides: Investigation and Mitigation* (Turner & Schuster, 1996), which has an extensive chapter on landslide types and processes."[14]

[11] OCCRI, *Future Climate Projections: Umatilla County*, October 2020.

[12] DLCD and DOGAMI, *Preparing for Landslide Hazards: A Land Use Guide for Oregon Communities*, https://www.oregon.gov/lcd/NH/Pages/Natural-Hazards.aspx

[13] Ibid.

[14] Ibid.

Location/Extent

In general, areas at risk to landslides can have a range of slopes and or a history of nearby landslides. Landslides can occur along river and creek banks, and along ocean bluff faces. Landslide hazards are also related to excavation and drainage practices, and the reactivation of preexisting landslide hazards.

The severity or extent of landslides is typically a function of geology and the landslide triggering mechanism. Rainfall initiated landslides tend to be smaller, and earthquake induced landslides may be very large. Even small slides can cause property damage, result in injuries, or take lives. Natural conditions and human activities can both play a role in causing landslides. The incidence of landslides and their impact on people and property can be accelerated by development.[15]

Umatilla County has rarely experienced major landslides. The NHMP Steering Committee noted that floods and debris flows can be problematic; this prompted a discussion of what debris flows are. This topic will be further described in the Landslides/Debris Flows Hazard Annex.

Table LS-1, Landslides Significant Historic Hazard Events, notes the dates, locations, and a description of the event, identifying if there was a disaster declaration related to it. Most of the landslides listed are statewide disaster declarations. For more information on the landslide hazard in Umatilla County see the Landslide/ Debris Flows Annex in Volume II Hazard Annexes.

Landslide was not one of the identified climate change metrics therefore OCCRI's *Future Climate Projections* report does not include information about landslides.

Volcanoes

Significant changes since 2014 NHMP

In the *2014 Umatilla County NHMP*, volcanic events were not scored and had no rank. In the *2021 Umatilla County NHMP*, volcanic events scored 127 and ranked eighth out of nine hazards (removed weather emergencies and added air quality).

Characteristics

Umatilla County and the Pacific Northwest lie within the "ring of fire", an area of very active volcanic activity surrounding the Pacific Basin. Volcanic eruptions occur regularly along the ring of fire, in part because of the movement of the Earth's tectonic plates. Volcanic eruptions have the potential to coincide with numerous other hazards including ash fall, earthquakes, lava flows, pyroclastic flows, lahars and debris flows, and landslides. Ash fall and earthquakes are the two associated hazards that have the potential to impact Umatilla County directly.

Location/Extent

Active volcanoes that could impact Umatilla County include composite volcanoes within the Cascades Mountain Range such as Mt. Hood, Mt. St. Helens, Mt. Adams, Mt. Shasta, and Crater Lake/Mount Mazama. If any of these volcanoes erupted, there is a possibility of ash that could affect air quality and/or the water quality.

The extent of damage from these hazards depends on the distance from the volcano, vent location, and type of hazardous events that occur during an eruption. Blast effects are unlikely to impact Umatilla County. The indirect effects of volcanoes within other counties must be considered; including disruption

[15] DLCD, OPDR, *Planning for Natural Hazards: Oregon Technical Resource Guide*, https://oregonexplorer.info/content/planning-natural-hazards-oregon-technical-resource-guide.

of engines of motor vehicles, ashfall on transportation routes, and ashfall causing widespread health concerns. Should an event force highways to be closed, Umatilla County and the cities will be isolated from the rest of the state. See the Volcanic Events Annex for additional information about volcanoes.

Volcanic events were not a climate change metric so OCCRI's *Future Climate Projections* report does not include volcanic events.

Wildfire

Significant changes since 2014 NHMP

Wildfire was ranked second in the *2014 Umatilla County NHMP*. In the *2021 Umatilla County NHMP* it is ranked fifth out of nine hazards (removed weather emergencies and added air quality).

Characteristics

Wildfires are increasingly common to all areas of Oregon. As such, the potential for losses due to Wildland-Urban Interface (WUI) fires in the urbanized region should not be ignored. Fire is an essential part of Oregon's ecosystem, but it is also a serious threat to life and property.

Wildfires that have the potential to affect Umatilla County can be divided into four categories: interface, wildland, firestorms, and prescribed burns. These are described in more detail in the Wildfire Annex. Ignition of a wildfire may occur naturally from lightning or from human causes such as debris burns, arson, careless smoking, and recreational activities or from an industrial accident. Once started, fuel, topography, weather, and development conditions affect fire behavior.

Location/Extent

In Eastern Oregon, large costly fires have become regular events, disrupted communities, cost millions of dollars in suppression and recovery costs, and increased the risk to private property owners. According to the Oregon Department of Forestry, "large fires that threaten dwellings are 48% more expensive to fight, and the likelihood of human-caused fires exponentially increases with the addition of each new home. Throughout Oregon's wildland-urban interfaces historically normal fires have become economically and socially unacceptable due to the scale of damage they cause.[16]

According to the Oregon Forest Resources Institute (OFRI), "Despite fire suppression systems regarded as best-in-class for private and public lands, lightning and human-caused wildfires ravaged the state's forest and rangelands, making 2017 one of the worst wildfire seasons on record." The OFRI also noted that both small and significant fires occurred in Oregon in 2017, burning 665,000 acres of forest and rangeland in more than 2,000 fires. The report from OFRI describes how wildfires directly impact our lives by examining these categories: air quality and health; sporting events; travel and tourism; employment and the economy; transportation; local impact; and long-term effects. The overall cost for fire suppression in Oregon in 2017 was $454 million. [17]

The extent of damage to Umatilla County from WUI fires is dependent on a number of factors, including temperature, wind speed and direction, humidity, proximity to fuels, and steepness of slopes. WUI fires can be intensified by development patterns, vegetation and natural fuels, and can merge into unwieldy and unpredictable events. In addition, wildfire also threatens timber products, cattle ranching and

[16] Oregon Department of Forestry, *Oregon Forests Report*, 2007-2009.

[17] Oregon Forest Resources Institute, *Impacts of Oregon's 2017 Wildfire Season: Time for a Crucial Conservation*, January 2, 2018.

agricultural areas near grasslands. Communities and areas particularly susceptible to wildfires include populated areas on the edges of wild land brush and wooded areas.

The areas where development meets vegetative fuels, such as forestland, are commonly referred to as the wildland-urban interface (WUI). Often these areas where development is next to areas with heavy fuel loads (vegetation) do not have adequate defensible space. Wildfires impact agriculture, buildings, transportation, utilities, and business. Smoke exposure is a hazard throughout Umatilla County when there are wildfires. Roads close because of smoke visibility issues, animals on the rangelands can be affected, and people have respiratory issues.

Umatilla County has three Community Wildfire Protection Plans (CWPP): the *West County CWPP* (2006), the *Blue Mountains and Foothills Region CWPP* (2005), and the *Mill Creek and Walla Walla County CWPP* (2017); this will be discussed in the Wildfire Annex in Volume II Hazard Annexes. For more wildfire information, see Table WF-1 Wildfire Significant Historic Hazard Events Table which notes the dates, locations, a description of the event, and identifies if there was a disaster declaration.

For more information on the air quality hazard, which often relates to wildfire, see the Air Quality section in this Risk Assessment, and see the Air Quality Annex in Volume II Hazard Annexes.

OCCRI's *Future Climate Projections* report states, "Wildfire risk, as expressed through the frequency of very high fire danger days, is projected to increase under future climate change. In Umatilla County, the frequency of very high fire danger days per year is projected to increase on average by about 15 days (with a range of -5 to +37) by the 2050s under the higher emissions scenario compared to the historical baseline." See Appendix E.

Severe Summer Storms

Significant changes since 2014 NHMP

In the *2014 Umatilla County NHMP*, severe summer storms were not ranked specifically but were included as part of weather emergencies. Weather emergencies were ranked first in the *2014 Umatilla County NHMP*. In the *2021 Umatilla County NHMP*, severe summer storms are ranked third out of nine hazards (removed weather emergencies and added air quality).

Characteristics

Extreme winds occur throughout Oregon, and most communities have some level of vulnerability to wind storms. Wind storms can result in collapsed or damaged buildings, damaged or blocked roads and bridges, damaged traffic signals, utilities, streetlights, and parks, among other impacts. Roads blocked by fallen trees during a wind storm may have severe consequences to people who need access to emergency services. Emergency response operations can be complicated when roads are blocked or when power supplies are interrupted. Wind storms can trigger flying debris, which can also damage utility lines; overhead power lines can be damaged even in relatively minor wind storm events. Industry and commerce can suffer losses from interruptions in electric service and from extended road closures.

Although rare, tornados can and do occur in Oregon.[18] Tornadoes are the most concentrated and violent storms produced by the earth's atmosphere. They are created by a vortex of rotating winds and strong vertical motion, which possess remarkable strength and cause widespread damage. Smaller wind events, often known as, "dust devils", can occur and pose some risk to the local community. According

[18] Taylor, George H. & Chris Hannan, *The Climate of Oregon*, OSU Press, 1999.

to The Tornado History Project, from December 6, 1951 through October 12, 2017, there have been 113 tornadoes in Oregon. There have been six fatalities from the 113 tornadoes.[19]

Location/Extent

The damaging effects of severe summer storms may extend for distances of 100 to 300 miles from the center of storm activity. Wind storms can occur year-round in Umatilla County. In this discussion we focus on the summer, while in the discussion of severe winter storms, we look at storms in the winter. The storm extent is determined by their track, intensity (the air pressure gradient they generate), and local terrain. All of Umatilla County is susceptible to high winds and strong wind gusts.

It is not uncommon for severe wind storms to cause trees to blow down or tree limbs to break and fall on power lines or roofs of homes or businesses. Severe wind storms can also damage roof beams or break shingles. Wind storms can cause power outages. Typically there are other factors contributing to the outage as well; such as water-saturated soils which allow for trees and power poles to fall easier. Wind storms can blow mobile homes off their foundations if not anchored properly or collapse agricultural storage barns with large, paneled sides.

Oregon and other western states experience tornadoes on occasion, many of which have produced significant damage and occasionally injury or death. Most of the tornadoes that develop in Oregon are caused by intense local thunderstorms. These storms also produce lightning, hail, and heavy rain, and are more common during the warm season from April to October.[20]

For more information on the wind storm hazard in Umatilla County see the Severe Summer Storms and Severe Winter Storms Annex in Volume II Hazard Annexes. The Significant Historic Hazard Events Tables, Table SS-5 and SS-6, includes winter and summer storms. The list is substantial. The table notes the dates, locations, and a description of the event, identifies if there was a disaster declaration related to it.

In OCCRI's *Future Climate Projections* report for Umatilla County, "Limited research suggests very little, if any, change in the frequency and intensity of wind storms in the Pacific Northwest as a result of climate change." Wind storms can be part of both summer and winter storms.

Severe Winter Storms

Significant changes since 2014 NHMP

In the *2014 Umatilla County NHMP*, severe winter storms were not ranked specifically but were included as part of weather emergencies. Weather emergencies were ranked first in the *2014 Umatilla County NHMP*. In the *2021 Umatilla County NHMP*, severe winter storms are ranked fourth out of nine hazards (removed weather emergencies and added air quality).

Characteristics

Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting Umatilla County typically originate in the Gulf of

[19] The Tornado Project, *Tornadoes in Oregon*, http://www.tornadohistoryproject.com/tornado/Oregon.

[20] Taylor, George H., Holly Bohman, and Luke Foster. August 1996. A History of Tornadoes in Oregon. Oregon Climate Service. Corvallis, OR: Oregon State University. http://www.ocs.orst.edu/pub_ftp/reports/book/tornado.html

Alaska or in the central Pacific Ocean. These storms are most common from October through March.[21] Winter storms are common in Eastern Oregon, where the air is generally cold enough for snow and ice, when a Pacific storm is associated with an air mass from the Gulf of Alaska, a major snowstorm may ensue.

Like snow, ice storms are comprised of cold temperatures and moisture, but subtle changes can result in varying types of ice formation, including freezing rain, sleet, and hail. Freezing rain can be the most damaging of ice formations. While sleet and hail can create hazards for motorists when it accumulates, freezing rain can cause the most dangerous conditions. Ice buildup can bring down trees, communication towers, and wires creating hazards for property owners, motorists, and pedestrians.

Location/Extent

All of Umatilla County is vulnerable to winter storms and impacts typically extend region-wide. Varied elevations and topography of the County mean that the impact of a storm is variable depending on the location. The mountains and buttes scattered throughout the County generally receive the highest amounts of rainfall and snowfall. Large snow packs built during winter months can lead to potentially increased flooding in the spring. State Highways are primary transportation routes that have historically been closed due to severe winter weather. The vulnerable population in Umatilla County is particularly susceptible to winter cold, air quality (wood smoke), and other impacts from severe winter storms.

For more information on the severe winter storm hazard in Umatilla County see the Severe Summer Storms and Severe Winter Storms Annexes in Volume II Hazard Annexes. The Significant Historic Hazard Events Tables, Table SS-5 and SS-6, includes winter and summer storms. The list is substantial, revealing a long history of events. The table notes the dates, locations, and a description of the event, identifies if there was a disaster declaration related to it.

In OCCRI's *Future Climate Projections* report, winter storms was not a metric. Therefore the report does not include winter storms. However, wind storms was a metric, and information related to that was described in the Severe Summer Storms section previously.

Air Quality

Significant changes since 2014 NHMP

In the *2014 Umatilla County NHMP*, air quality was not an identified natural hazard. In the *2021 Umatilla County NHMP*, air quality was added by the Steering Committee. It ranked second out of the nine natural hazards (removed weather emergencies and added air quality).

Characteristics

Umatilla County experiences periods of air stagnation and atmospheric temperature inversions that trap pollution. Past air quality issues typically arose from field burning and the use of wood stoves for winter heating, and that continues to some extent. There are also issues related to smoke from wildfires, diesel engines, and industry. If a volcano were to erupt there would be ashfall.

[21] DLCD, *2012 Oregon Natural Hazards Mitigation Plan*, https://oregonexplorer.info/content/oregon-natural-hazard-mitigation-plan-2012.

Location/ Extent

Air quality issues can occur widely across Umatilla County, affecting the unincorporated rural areas and the incorporated cities. Wildfires tend to provide a wide ranging source of smoke that can blanket large areas and be detrimental to health of people, animals, and plants. Wood burning stoves tend be a more concentrated, point source type of pollution that decreases air quality. Diesel emissions also contribute to lower air quality. If a volcano were to erupt, ashfall could inundate the areas sufficiently to impact transportation and cause widespread health concerns.

For more information on the air quality hazard in Umatilla County see the Air Quality Annex in Volume II Hazard Annexes. The Significant Historic Air Quality Events Table, Table AQ-3, notes the dates, locations, and a description of the event.

In OCCRI's *Future Climate Projections* report, air quality is a metric. The report notes that air quality in Umatilla County is expected to worsen due to climate change and therefore poor air quality is to be increasing in risk; the level of confidence in that direction of change is low (out of low, medium, and high confidence). The report also states that wildfires are primarily responsible for days when air quality standards for $PM_{2.5}$ are exceeded in Western Oregon and parts of Eastern Oregon (Liu *et al.*, 2016), although woodstove smoke and diesel emissions are also main contributors (Oregon DEQ, 2016).

In addition, the report states that under future climate change, the risk of wildfire smoke exposure is projected to increase in Umatilla County. Also, in Umatilla County, the number of "smoke wave" days is projected to increase by 141% and the intensity of "smoke waves" is projected to increase by 82% by 2046–2051 under a medium emissions scenario compared with 2004–2009.

Hazard Probability

The *2021 Umatilla County NHMP* update provided the opportunity to conduct a new Hazards Vulnerability Analysis (HVA) and to revisit the hazards, update the analysis, and reestablish the mitigation action priorities as necessary. The DLCD Natural Hazards Planner and the Steering Committee performed a Hazard Vulnerability Analysis on September 29, 2020 and revisited it on October 27, 2020.

Prior to 2020, Umatilla County's HVA was last completed in July 2012, which was an update to the one done for the Umatilla County *Emergency Operations Plan* adopted 12/17/03. The HVA was included as the unnumbered table called "Umatilla County Risk Analysis Matrix (updated July 2020)" in Umatilla County's *2014 Natural Hazards Mitigation Plan (2014 NHMP)* on page 102. The natural hazards in the *Emergency Operations Plan* were weather emergencies, wildfire, flood, and earthquake; these do not exactly match the natural hazards that were identified in *2014 NHMP* and have mitigation actions related to them. This provides some challenge to making risk score comparisons between NHMPs.

With the HVA conducted in 2020, **Umatilla County's natural hazards** are updated:

- Floods
- Air Quality (added)
- Severe Summer Storms (also listed formerly weather emergencies)
- Severe Winter Storms (also listed formerly weather emergencies)
- Wildfire
- Drought
- Earthquakes
- Volcano
- Landslides/Debris Flows

The methodology for this **hazard analysis** was first developed by FEMA in 1983. It was gradually refined by Oregon's Office of Emergency Management (OEM) and shared with local jurisdictions across Oregon. Although nearly every jurisdiction in Oregon uses this process, the range of values is relative only within the individual jurisdiction; unless two or more jurisdictions conduct their analyses at the same time and utilize the same criteria in determining the values to apply. It is not meant to compare one jurisdiction to another. These calculations and hazard analysis should not be applied to other jurisdictions without familiarization with the process applied.

The methodology produces scores that range from 24 (lowest possible) to 240 (highest possible), one order of magnitude from lowest to highest**. Vulnerability** and **probability** are the two key components of the methodology.

- **Vulnerability** examines both typical and maximum credible events. It accounts for approximately 60% of the total score.
- **Probability** endeavors to reflect how physical changes in the jurisdiction and scientific research modify the historical record for each hazard. It accounts for approximately 40% of the score.

This particular hazard analysis is an early step in determining the risk – the potential for harm – facing a community. When complete, it provides a table of relative risks to focus planning priorities on those hazards most likely to occur and cause the most damage. This analysis is constructed to:

- Establish priorities for planning, capability development, and hazard mitigation,
- Identify needs for hazard mitigation measures,
- Educate the public as well as public officials about hazards and vulnerabilities, and
- Make informed judgments about potential risks.

Values assigned are very subjective.

DESIGNATION	RATING
LOW	0 to 3
MEDIUM	4 to 7
HIGH	8 to 10

History is the record of previous occurrences requiring a response.

Low:	0-1 event in the past 10 years
Medium:	2-3 events in the past 10 years
High:	4+ events in the past 10 years

The weight factor for the history category is 2.

Vulnerability is a measure of the percentage of the population and property likely to be affected during an occurrence of an incident.

Low:	<1% affected
Medium:	1 – 10% affected
High:	>10% affected

The weight factor for the vulnerability category is 5.

Maximum Threat is a measure of the highest percentage of the population or property which could be impacted under a worst-case scenario.

Low:	<5% affected
Medium:	5 – 25% affected
High:	>25% affected

The weight factor for the maximum threat category is 10.

Probability is a measure of the likelihood of a future event occurring within a specified period of time.

Low:	more than 10 years between events
Medium:	from 5 to 10 years between events
High:	likely within the next 5 years

The weight factor for the probability category is 7.

By multiplying the *weight factors* associated with the categories by the *severity ratings*, a sub-score for history, vulnerability, maximum threat, and probability for each hazard is obtained. This information is captured in a table showing each of those four sub-scores as well as the total score for the hazard. Adding the sub-scores will produce a **total** score, called the risk score, for each hazard.

Discussion occurred regarding the definitions of the weighted measures. For example, when defining vulnerability and maximum threat, the percentages are based on those "affected." Questions arose as to how much impact or influence is considered "affected" to the population and property. We noted populations in cities and in unincorporated areas. Property damages could be substantial everywhere. Estimating the appropriate percentage for vulnerability and maximum threat provided some challenge.

Table 2-3 includes the 2021 NHMP Hazard Vulnerability Analysis scores for Umatilla County as well as the full list of natural hazards and their sub-scores for the components that comprise the risk score.

Table 2-3 2021 NHMP Hazard Vulnerability Analysis scores for Umatilla County

HAZARD	HISTORY WF = 2	VULNERABILITY WF = 5	MAX THREAT WF = 10	PROBABILITY WF = 7	RISK SCORE
Severe Winter Storms	2 x **7.5**	5 x **9**	10 x **9**	7 x **10**	**220**
Severe Summer Storms	2 x **9**	5 x **9**	10 x **9**	7 x **10**	**223**
Earthquakes	2 x **1**	5 x **9**	10 x **9**	7 x **2**	**151**
Droughts	2 x **7**	5 x **9**	10 x **9**	7 x **5**	**184**
Floods	2 x **10**	5 x **10**	10 x **10**	7 x **10**	**240**
Volcano	2 x **0**	5 x **8**	10 x **8**	7 x **1**	**127**
Wildfire	2 x **9**	5 x **9**	10 x **7**	7 x **10**	**203**
Landslides/Debris Flows	2 x **7**	5 x **4**	10 x **3**	7 x **3**	**85**
Air Quality	2 x **7**	5 x **9**	10 x **9.5**	7 x **10**	**224**

Source: DLCD Natural Hazards Planner, Tricia Sears, and the Umatilla County NHMP Steering Committee, 2020.

To begin the discussion, DLCD staff asked the SC what they thought were their most common and impactful hazards are. We talked about the perception versus what the data shows, in terms of most

common and impactful hazards. The SC said floods were the most common and impactful. The risk score results supported that with 240 as the flood risk score (out of 240), taking the #1 spot. Pendleton staff specifically noted they had three floods in two years.

Severe summer storms was second with a risk score of 223 and severe winter storms was a close third with a risk score of 220. Wildfire was the fourth highest risk score at 203.

Discussion occurred regarding the definitions of the weighted measures. For example, when defining vulnerability and maximum threat, the percentages are based on those "affected." Questions arose as to how much impact or influence is considered "affected" to the population and property. In the discussion it was noted that impacts are in both urban areas/incorporated cities, and in the unincorporated areas. Property damages could be substantial.

The group came to consensus on the ratings for each of the four measures, as well as the total score, for each hazard. The total score is the risk score.

The SC said the biggest city in Umatilla County is Hermiston with approximately 18,000 people and there are approximately 80,000 people in Umatilla County.

For the Hazard Vulnerability Analysis discussion, DLCD provided a document called Significant Hazard Events. This document included a short list of significant events for Umatilla County's natural hazards. The document noted the dates, a description of the event, and identified if there was a disaster declaration related to it. It also described additional lists and tables with hazards events and that these would be updated as part of the NHMP.

The total risk scores from the HVA are listed in Table 2-4 as the risk score. After establishing the risk scores they were put into levels using a high, medium, and low designation, as shown in Table 2-4.

Table 2-4 Natural Hazards, Risk Scores, and Risk Levels for Umatilla County

HAZARD	RISK SCORE	RISK LEVEL (H-M-L)
Floods	240	High
Air Quality	224	High
Severe Summer Storm	223	High
Severe Winter Storm	220	High
Wildfire	203	High
Drought	184	Medium
Earthquakes	151	Medium
Volcano	127	Medium
Landslides/Debris Flows	85	Low

Source: DLCD Natural Hazards Planner, Tricia Sears, and the Umatilla County NHMP Steering Committee, 2020.

In the *2014 Umatilla County NHMP*, it was Umatilla County and the Cities of Adams, Pilot Rock, and Umatilla that were included as indicated by the FEMA approval letter. For the *2021 Umatilla County NHMP*, it should be noted that the NHMP involves a long list of participating jurisdictions; these are

listed below in Table 2-5. The jurisdictions with signed IGAs are called plan holders and they are marked with an asterisk; there are seventeen. The SC was comfortable that one HVA could be performed together with all the jurisdictions participating. This would be efficient and demonstrate collaboration; it would be very important to capture all the comments in the discussion, as well as similarities and differences between the jurisdictions.

Table 2-5 The Participating Jurisdictions in the 2021 Umatilla County NHMP Update

This is the full list of those on the NHMP Steering Committee Roster. Those marked with * have signed an IGA with DLCD and have agreed to participate and provide in kind contributions. They are referred to as partner plan holders in this NHMP.
Umatilla County*
Oregon Department of Land Conservation & Development (DLCD)
Pendleton*
Milton-Freewater*
Hermiston*
Athena*
Weston*
Ukiah*
Echo*
Stanfield*
Umatilla*
Adams*
Helix*
Pilot Rock*
Walla Walla River Irrigation District*
Milton-Freewater Water Control District
Stanfield Irrigation District*
Umatilla County SWCD*
Hermiston Irrigation District*
Umatilla Co FD #1
East Umatilla Fire & Rescue District
National Weather Service - Pendleton
NWS Pendleton - Local Emergency Planning Committee
City of Pendleton - Local Emergency Planning Committee
City of Pendleton – Strategic Planning
USDA-Umatilla National Forest - Fire
Oregon Department of Forestry - Fire
Clearview Disability Resource Center
Confederated Tribes of the Umatilla Indian Reservation
County Board of Commissioners
Walla Walla Basin Watershed Council
US Army Corps of Engineers - Portland District
US Army Corps of Engineers – Walla Walla District
Greater Eastern Oregon Development Corporation

Umatilla County Sheriff's Office
Umatilla County Public Works
Energy Trust of Oregon
Oregon Office of Emergency Management (OEM)
Oregon Climate Change Research Institute (OCCRI)

Source: Tricia Sears, DLCD, October 28, 2020

Some of the risk scores of the natural hazards changed greatly between the *2014 Umatilla County NHMP* and the *2021 Umatilla County NHMP*. Here is the comparison of the total risk scores from the *2014 Umatilla County NHMP* and the *2021 Umatilla County NHMP*.

Table 2-6 2020 Total Risk Scores and Rankings with 2012 Total scores and Rankings for Comparison, from the 2014 NHMP

HAZARD	2020 SCORES	2020 RANKING	2012 SCORES	2012 RANKING
Floods	240	1	165	3
Air Quality	224	2	NA	NA
Severe Winter Storms	223	2	*	*
Severe Summer Storms	220	3	*	*
Wildfire	203	4	190	2
Droughts	184	5	No score	NA
Earthquakes	151	6	149	4
Volcanoes	127	7	No score	NA
Landslides/Debris Flows	85	8	No score	NA
Weather Emergencies*			240	1

Source: Tricia Sears, DLCD, October 28, 2020

Here is the description of each of the identified natural hazards as included in the Hazard Vulnerability Analysis Summary dated 10/28/20.

Flooding was a big concern. The SC noted that many people have been displaced by the floods in the past couple of years, streams/creeks/rivers are changing course and erosion areas have changed, and property and infrastructure have sustained a lot of damage. Both Pendleton and Umatilla staff stated the floods have been very damaging to them. McKay Creek and the Umatilla River have flooded these cities multiple times in recent years. It was noted that nearly every community in the County has experienced flooding in recent years.

Severe summer and winter storms happened frequently in the past and the SC believes those will continue to happen. Echo staff noted that wind is very impactful to their community, in addition to

floods. The winds impact power lines and poles, and trees. With the agricultural economy, summer and winter storms can be economically devastating.

Someone stated there have been evacuations made in the last three years due to **wildfires**. The areas that were evacuated were not identified. One SC member noted that wildfires could impact the area's energy resources, particularly solar, because of smoke and haze.

Droughts are the hazard with the fifth highest risk score. Staff from Milton-Freewater stated that the economic impacts of droughts is severe since agriculture is a substantial portion of the economy in Umatilla County.

Earthquakes were noted as a local concern. The SC members described how a Cascadia Subduction Zone (CSZ) earthquake would impact them. The SC said that there is a fault line in Milton-Freewater that could cause local earthquakes and impacts. There are a lot of cities with one and two story buildings, many are unreinforced masonry (URMs). URMs are prone to damage from earthquakes.

With the CSZ, the SC noted the facilities in Umatilla County that are of significance for large scale disasters. These could be a factor in other hazards besides the CSZ. The facilities of significance that may potentially be used include: Pendleton Roundup area; Port of Pendleton; Hermiston Fairgrounds; Pendleton Airport; and the former chemical depot.

Of note, as identified by Tom Roberts, Umatilla County's Emergency Manager, the northwest portion of Umatilla County is within the Hanford Response Zone. An earthquake could cause damage to Hanford that results in low level radiation being emitted.

Umatilla County and other counties in Eastern Oregon would be staging areas for equipment and supplies that would be needed in Western Oregon, where CSZ impacts will be severe. Eastern Oregon may also be a refuge and safe area for those that leave Western Oregon. The US Army Corps of Engineers staff stated the fuel resources would be limited due to the impacts of the CSZ to Oregon's fuel hub in Portland. Trucks, rail, and river traffic are the passageways typically for fuel to be delivered and those will be damaged. They noted that land and rail deliveries would be redirected from Omaha, Nebraska to here.

Earthquakes are from the usually cited four sources: (a) the off-shore Cascadia Subduction Zone (CSZ), (b) deep intraplate events within the subducting Juan de Fuca plate, (c) shallow crustal events within the North America Plate, and (d) earthquakes associated with renewed volcanic activity. The Cascadia Subduction Zone and the subduction process is responsible for most of the earthquakes in the Pacific Northwest as well as for creating the volcanoes in the Cascades. Researchers recently calculated the likelihood of a Magnitude 8 to 9 Cascadia Subduction Zone earthquake at 37% over the next 50 years. The last such event occurred in January of 1700, causing a tsunami in Japan.

Volcano had the seventh lowest risk score. There have been no volcanic eruptions in this area in quite some time; Mt. St. Helens in 1980 was the most recent and closest event mentioned. The history and probability scores are very low, but if one were to occur the SC noted the impacts would be substantial. Although not highly vulnerable to most direct volcanic hazards such as blast effects, relatively nearby volcanoes could inundate the area with ashfall sufficient to impact transportation and cause widespread health concerns.

Landslides/debris flows was the natural hazard with the lowest risk score. Pendleton staff stated their concern about debris flows happening. There was some discussion to clarify what a debris flow is. The USGS provides this definition of debris flow in a flyer "Debris Flows Hazards in the United States" see https://pubs.usgs.gov/fs/fs-176-97/fs-176-97.pdf.

Debris flows, sometimes referred to as mudslides, mudflows, lahars, or debris avalanches, are common types of fast-moving landslides. These flows generally occur during periods of intense rainfall or rapid snowmelt. They usually start on steep hillsides as shallow landslides that liquefy and accelerate to speeds that are typically about 10 mph, but can exceed 35 mph. The consistency of debris flows ranges from watery mud to thick, rocky mud that can carry large items such as boulders, trees, and cars. Debris flows from many different sources can combine in channels where their destructive power may be greatly increased. They continue flowing down hills and through channels, growing in volume with the addition of water, sand, mud, boulders, trees, and other materials. When the flows reach canyon mouths or flatter ground, the debris spreads over a broad area, sometimes accumulating in thick deposits that can wreak havoc in developed areas.

Air quality was noted at the 9/29/20 SC meeting as a potential natural hazard to have identified. DLCD staff stated that several other jurisdictions have air quality as a hazard in their NHMP (Medford and Lake County have had it for years, Harney County added it with the most recent NHMP, and Malheur County noted they would add it to their next NHMP). Vincent Papol from National Weather Service stated that it would be good to add air quality as an identified natural hazard for the NHMP. Bob Waldher and Tom Roberts supported the suggestion, as did other SC members. At the 10/27/20 SC meeting, the SC agreed to add air quality as a natural hazard. The OEM Methodology was used to provide a risk score, as shown.

Community Vulnerability

Vulnerability is a measure of the exposure of the built environment to hazards. The exposure of community assets to hazards is critical in the assessment of the degree of risk a community has to each hazard. Identifying the facilities and infrastructure at risk from various hazards can assist the county in prioritizing resources for mitigation, and can assist in directing damage assessment efforts after a hazard event has occurred. The exposure of county and city assets to each hazard and potential implications are explained in each hazard section.

Vulnerability includes the percentage of population and property likely to be affected under an "average" occurrence of the hazard. Community vulnerabilities are an important supplement to the NHMP risk assessment. For more in-depth information regarding specific community vulnerabilities, see the Volume II Hazard Annexes and Appendix B Community Profile.

Populations

The socio-demographic qualities of the community population such as language, race and ethnicity, age, income, and educational attainment are significant factors that can influence the community's ability to cope, adapt to and recover from natural disasters. Historically, 80 percent of the disaster burden falls on the public.[22] Of this number, a disproportionate burden is placed upon vulnerable populations such as children, the elderly, the disabled, minorities, and low-income persons. Outreach and community planning can reduce immediate and long-term socio-demographic impacts from natural hazards.

Population Vulnerabilities

- As of 2016, Umatilla County has 14.8% of the population over the age of 65. For comparison, note the percentages of several nearby counties: Morrow County has 15.8% of the

[22] Hazards Workshop Session Summary #16, *Disasters, Diversity, and Equity*, (July 2000). University of Colorado, Boulder.

population over the age of 65. Union County has 20.3% of the population over the age of 65. Grant County has 31.1% of the population over the age of 65.[23]

- While the statewide population is aging, another demographic shift is occurring across Oregon: minority populations are growing as a share of total population. A growing minority population affects both the number of births and average household size.[24]
- Rural counties tend to have a lower per capita personal income than metro counties.[25]

Economy

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. 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 recover from a disaster.

Economic Vulnerabilities

- In 2016, Umatilla County had a per capita personal income of $36,434, which is ranked 27th out of 36 counties, in the Per Capita Personal Income for Oregon Counties.[26]
- In 2019, Umatilla County had a per capital personal income of $41,928, which is ranked 30th out of 36 counties, in the Per Capita Personal Income for Oregon Counties.[27]
- According to the Oregon Employment Department, the Umatilla County unemployment rate was 5.0% in November 2020.[28]
- In the event of a large-scale disaster, and in the situation of multiple hazards impacting an area, unemployment has the potential to rise. Businesses and companies may be unable to overcome the hazard(s) event(s).
- The two-county Columbia Basin area (Morrow and Umatilla) is expected to add 3,010 jobs from 2019 to 2029, with total employment rising to 44,620. The 10-year projection pegs growth in the Columbia Basin area at 7 percent, below Oregon's 9 percent increase.[29]

[23] Oregon Employment Department, *Employment Landscape of Rural Oregon*. May 2017, https://www.qualityinfo.org/documents/10182/13336/The+Employment+Landscape+of+Rural+Oregon?version=1.2

[24] Ibid.

[25] Ibid.

[26] Ibid.

[27] Oregon Employment Department, *Per Capital Personal Income in Oregon's Counties*, https://www.qualityinfo.org/-/per-capita-personal-income-in-oregon-s-counties?inheritRedirect=true&redirect=%2Fed, accessed January 7, 2021.

[28] Oregon Employment Department, *Local Area Unemployment Statistics (LAUS) All Areas*, https://www.qualityinfo.org/ed-dwnl/?at=1&t1=~unemprate~y~03~2019~2019~, accessed January 7, 2021.

[29] Oregon Employment Department, *Columbia Basin Industry Employment Projections, 2019-2029*, https://www.qualityinfo.org/-/columbia-basin-industry-employment-projections-2019-2029?inheritRedirect=true&redirect=%2Feastern-oregon, accessed January 7, 2021

- Employment in the Columbia Basin totaled 41,610 in the 2019 base year. Private industry employment represented about 73 percent or 30,180 jobs. Self-employment represented 4 percent or 1,790 jobs and government held about 23 percent or 9,640 jobs.[30]

Environment

The capacity of the natural environment is essential in sustaining all forms of life including human life, yet it often plays an underrepresented role in community resilience to natural hazards. The natural environment includes land, air, water and other natural resources that support and provide space to live, work and recreate.[31] Natural capital 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. When natural systems are impacted or depleted by human activities, those activities can adversely affect community resilience to natural hazard events.

The physical geography, weather, climate and land cover of an area represent various interrelated systems that affect overall risk and exposure to natural hazards. Climate change variability also has the potential to increase the effects of hazards in the area. These factors combined with a growing population 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.

Environmental Vulnerabilities

- Umatilla County is 3,215 square miles in size and the population per square mile is 23.6 based on the Census, April 2010. The overall population of Umatilla County was 75,889 in 2010 [32]
- Umatilla County is mostly within the Columbia Plateau ecoregion as described by the *Oregon Conservation Strategy*. The Oregon portion of the Columbia Plateau ecoregion extends from the eastern slopes of the Cascade Mountains to the Blue Mountains ecoregion. The *Oregon Conservation Strategy* describes that Key Conservation Issues of particular concern in this ecoregion include water quality, water quantity, and invasive species. In addition to the statewide issues, soil erosion, habitat fragmentation, and large-scale energy development are of conservation concern in this ecoregion. [33]
- Oregon's Department of Land Conservation and Development contracted with the Oregon Climate Change Research Institute to perform and provide analysis of the influence of climate change on natural hazards. The report is provided in Appendix E.

For further consideration of environmental vulnerabilities, see Appendix E. In Appendix E Future Climate Projections Reports, the Oregon Climate Change Research Institute's (OCCRI) *Future Climate Projections Umatilla County: A Report to the Oregon Department of Land Conservation and Development* provides important information regarding the influence and impacts of climate change on existing natural

[30] Oregon Employment Department, *Columbia Basin Industry Employment Projections, 2019-2029*, https://www.qualityinfo.org/-/columbia-basin-industry-employment-projections-2019-2029?inheritRedirect=true&redirect=%2Feastern-oregon, accessed January 7, 2021

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

[32] United States Census, *Quick Facts, Umatilla County, Oregon*, https://www.census.gov/quickfacts/umatillacountyoregon, accessed January 7, 2021

[33] Oregon Fish and Wildlife, *Oregon Conservation Strategy*, *Columbia Plateau*, https://www.oregonconservationstrategy.org/ecoregion/northern-basin-and-range/, accessed January 7, 2021

hazards events such as heavy rains, river flooding, drought, heat waves, cold waves, wildfire, and air quality.

National Flood Insurance Program (NFIP)

The Umatilla County Flood Insurance Rate Maps (FIRMs), like much of Eastern Oregon, are not modernized. However, this work is in process. Below is a recap of current information related to the NFIP in Umatilla County, both in the cities and the unincorporated areas. For more details see the Flood Annex section of the Hazard Annexes and Table FL-5 Flood Insurance Details. Additional information about the NFIP maps and floods is included in the Flood Annex.

A brief recap of Table FL-5 is included here:

- Umatilla County, the Cities, and the CTUIR have 298 National Flood Insurance Program (NFIP) policies in force as of 1/8/21.[34]
- There are 273 residential flood insurance policies and there are 25 non-residential flood insurance policies.[35]
- There have been 94 paid claims as of 1/8/21.[36]
- Private insurance is an option. As of 1/15/21, there are 105 private flood insurance policies at one independent insurance provider in Pendleton. There is no information on the total number of private flood insurance policies in the entirety of Umatilla County.[37]
- There have been two repetitive losses and no severe repetitive losses.[38]
- Umatilla County and the cities have had some Community Assistance Visit (CAV) and Community Assistance Contact (CAC) according to the FEMA Community Information System database and DLCD's records. See Table FL-5. [39]
- The City of Stanfield is member of the Community Rating System (CRS) but Umatilla County and the other jurisdictions are not.[40]

Critical Infrastructure, Critical Facilities, and Lifelines

Critical facilities (i.e. police, fire, and government facilities), housing supply, and physical infrastructure 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.

[34] Katherine Daniel, Natural Hazards Planner, DLCD, 1/8/21.

[35] Ibid.

[36] Ibid.

[37] Brenda Primer, Insurance Agent, Wheatland Insurance, personal communication, 1/15/21

[38] Scott Van Hoff, Regional Flood Insurance Liaison, FEMA Region 10, 11/12/20

[39] Jason Gately, Natural Hazards Planner, DLCD, 4/1/20 and Katherine Daniel, Natural Hazards Planner, DLCD, 1/8/21

[40] FEMA, *Community Rating System Eligible Communities Effective October 1, 2020,* https://www.fema.gov/sites/default/files/2020-08/fema_crs_eligible-communities_oct-2020.pdf, accessed 1/7/21

Critical Infrastructure, Critical Facilities, and Lifelines: Definitions

One definition of **critical infrastructure** is "Systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters"[41]

A definition of **critical facilities**: **"**Structures and institutions necessary, in the community's opinion, for response to and recovery from emergencies. Critical facilities must continue to operate during and following a disaster to reduce the severity of impacts and accelerate recovery." [42]

A definition of **lifelines**: "Lifelines include utility systems (potable water, wastewater, oil, natural gas, electric power facilities and communication systems) and transportation systems (airways, bridges, roads, tunnels and waterways). Communication facilities are also important lifelines."[43]

From the *2014 Umatilla County NHMP*, April 2014:

"**Critical / essential facilities** are those necessary for government response and recovery activities (i.e. life safety and property, property and environmental protection, etc.) and must be protected to assure adequate management of emergency situations. These facilities include: 911 dispatch centers, emergency operation centers, police and fire stations, public works facilities, sewer and water facilities, corrections centers, and public service buildings (courthouses, city halls, etc.)."

"**Critical infrastructure** includes those systems necessary for the day to day operation of Umatilla County. This infrastructure includes: electricity transmission, natural gas and other utilities, and arterial transportation including rail, air, auto, and water."

"**Vulnerable population centers**: Vulnerable populations include those facilities that house or could receive individuals with special needs to conduct day to day activities. These areas include: hospitals and care centers, schools, nursing homes and assisted living facilities."

The NHMP Steering Committee decided to retain the three categories of assets described in the 2014 Umatilla County NHMP. Table 2-7 includes the critical/essential facilities, the critical infrastructure, and the vulnerable populations for Umatilla County and the twelve incorporated cities. These are assets and they are listed by jurisdiction within each of the three categories. The exact location of the asset is not identified in Table 2-7. Note that there is only one asset listed in Table 2-7 for the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and it is shared with the City of Pendleton. This is not a full list of CTUIR's assets. The CTUIR have a separate NHMP; they will be updating that NHMP soon.

[41] U.S. Department of Homeland Security, *Critical Infrastructure Sectors*, https://www.dhs.gov/cisa/critical-infrastructure-sectors.

[42] FEMA, *Hazard Mitigation Assistance (HMA) Guidance: Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program,* February 27, 2015, https://www.fema.gov/media-library-data/1424983165449-38f5dfc69c0bd4ea8a161e8bb7b79553/HMA_Guidance_022715_508.pdf.

[43] City of Portland, *Portland Local Energy Assurance Plan,* 2012.

Table 2-7 Critical /Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers for Umatilla County and the Twelve Incorporated Cities and the Natural Hazard that May Impact Them

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Critical/ Essential Facilities										
Adams										
Adams Fire Station #2	Adams	no	no	yes	yes	no	no	no	yes	yes
Adams Water Reservoir	Adams	no	No	Yes	no	No	Yes	Yes	Yes	yes
Adams Well Head	Adams	No	No	Yes	No	No	No	Yes	Yes	yes
Adams City Hall	Adams	No	No	Yes	Yes	No	No	No	Yes	Yes
Adams Community Center	Adams	No	No	Yes	Yes	No	Yes	No	Yes	yes
Hwy 11 Grain Elevator (Internet tower)	Adams	No	No	Yes	No	No	No	No	Yes	Yes
Preston Street Bridge	Adams	No	No	Yes	Yes	No	No	No	No	No
Commercial Street Bridge	Adams	No	No	Yes	Yes	No	No	No	No	No
Athena										
Athena Water Tank #1	Athena	No	No	Yes	No	No	No	No	No	No
Athena Water Tank #2	Athena	No	No	Yes	No	No	No	No	No	No
Athena Wastewater Treatment Facility	Athena	No	No	Yes	Yes	No	No	No	Yes	Yes
Athena Fire Station	Athena	No	No	Yes	No	No	No	No	Yes	Yes
Athena City Hall	Athena	No	No	Yes	Yes	No	No	No	Yes	Yes
East Umatilla County Health/Ambulance Station	Athena	No	No	Yes	No	No	No	No	Yes	Yes
Athena Well #2 – City Park	Athena	No	No	Yes	Yes	No	No	No	No	No
Athena Well #3 – Pambrun Road	Athena	No	No	Yes	Yes	No	No	No	No	No
Athena Well #4 – Pambrun Road	Athena	No	No	Yes	Yes	No	No	No	No	No
Athena Well #5 – Waterman Road	Athena	No	No	Yes	Yes	No	No	No	No	No
Hermiston										
Boyd Dam	Hermiston	No	No	Yes	no	No	No	no	No	no
Three Mile Dam	Hermiston	No	No	Yes	yes	No	No	no	No	no
Umatilla County Fire District Station 22	Hermiston	Yes	No	yes	No	No	Yes	Yes	yes	yes

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Umatilla County Fire District Station 23	Hermiston	Yes	No	yes	No	No	Yes	Yes	yes	yes
Umatilla County Fire District Station 25	Hermiston	Yes	No	yes	No	No	Yes	Yes	yes	yes
Bob Shannon Public Safety Center	Hermiston	No	No	Yes	No	No	Yes	No	Yes	Yes
Hermiston Butte Water Tank	Hermiston	No	No	Yes	No	No	Yes	No	Yes	Yes
Hermiston Well #6 (Highway 395 S)	Hermiston	No	No	Yes	No	No	Yes	No	Yes	Yes
Hermiston Well #5 (Highway 395 S)	Hermiston	No	Yes	Yes	No	No	Yes	No	Yes	Yes
Hermiston South Water Tank (Highway 395 S)	Hermiston	No	No	Yes	No	No	Yes	No	Yes	Yes
Hermiston North Water Tank (E Punkin Center Road)	Hermiston	No	No	Yes	No	No	Yes	No	Yes	Yes
Hermiston Public Works and Water Tank (NE 4th St)	Hermiston	No	No	Yes	No	No	Yes	Yes	Yes	Yes
Hermiston Regional Water Treatment Plan (HWY 207)	Hermiston	No	No	Yes	No	No	Yes	Yes	Yes	Yes
Regional Water Intake Station (Port of Umatilla)	Hermiston	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Hermiston Wastewater Plant	Hermiston	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hermiston Post Office	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Good Shephard Hospital	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Eastern Oregon Trade and Events Center	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Hermiston Irrigation District										
Cold Springs Reservoir Dam	Hermiston	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Feed Dam	Hermiston	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Maxwell Dam	Hermiston	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Maxwell Delivery Canal	Hermiston	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Maxwell Diversion Canal	Hermiston	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Echo										
Sewer Pump Station	Echo	no	no	Yes	Yes	no	no	no	Yes	Yes
Echo Rural Fire Department	Echo	no	no	Yes	Yes	no	no	no	Yes	Yes
Echo Post Office	Echo	no	no	Yes	Yes	no	no	no	no	yes
Echo City Hall & EOC	Echo	no	no	Yes	Yes	no	no	no	Yes	Yes
Echo - Potable Well #3	Echo	no	no	Yes	Yes	no	no	no	Yes	yes
Echo - Potable Water Treatment facility	Echo	no	no	Yes	no	no	no	no	Yes	yes

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Echo - Potable Booster Station	Echo	no	no	Yes	no	no	no	no	Yes	Yes
Echo - potable well #5	Echo	no	no	Yes	no	no	no	no	yes	yes
Echo - Golf Course Water Pump Station	Echo	no	no	Yes	no	no	no	no	yes	Yes
Echo - Potable Pressure Reducing Station	Echo	no	no	Yes	no	no	no	no	no	Yes
Echo School District - Evac Center	Echo	no	no	Yes	Yes	no	no	no	Yes	Yes
Echo - Potable Water Storage Tank	Echo	no	no	Yes	no	no	no	no	no	yes
Waste Water Ponds A - C	Echo	no	no	Yes	Yes	no	no	no	Yes	Yes
Waste Water Pump & Treatment	Echo	no	no	Yes	Yes	no	no	no	Yes	Yes
Helix –										
Helix Fire Station – Juniper	Helix	no	no	yes	no	no	no	no	yes	yes
Helix Water Tank	Helix	no	yes	yes	no	no	no	no	no	no
Pendleton										
McKay Creek Reservoir/ Dam	Pendleton	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Umatilla County Courthouse	Pendleton	No	No	Yes	No	No	No	No	Yes	Yes
Umatilla County Emergency Operations Center	Pendleton	No	No	Yes	No	No	No	No	Yes	Yes
Umatilla County Road Department	Pendleton	No	No	Yes	No	No	No	No	Yes	Yes
Pendleton Water Treatment Plant	Pendleton	No	No	Yes	No	Yes	No	No	Yes	Yes
Pendleton Wastewater Treatment Plant	Pendleton	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Water Distribution Well 1 (Byers)	Pendleton	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Water Distribution Well 2 (Round-Up)	Pendleton	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Water Distribution Well 3 (SW 21st)	Pendleton	No	Yes	Yes	No	Yes	No	No	Yes	Yes
Water Distribution Well 4 (Hospital)	Pendleton	No	Yes	Yes	No	Yes	No	No	Yes	Yes
Water Distribution Well 5 (Stillman)	Pendleton	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Water Distribution Well 7 (Mission)	Pendleton	No	Yes	Yes	No	Yes	No	No	Yes	Yes
Water Distribution Well 8 (Prison)	Pendleton	No	Yes	Yes	No	Yes	No	No	Yes	Yes
Water Distribution Booster 1 (River Intake)	Pendleton	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Water Distribution Booster 2 (High Level)	Pendleton	No	Yes	Yes	No	Yes	No	No	Yes	Yes
Water Distribution Booster 3 (Airport)	Pendleton	No	Yes	Yes	No	No	No	No	No	No

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Water Distribution Booster 4 (Cemetery)	Pendleton	No	Yes	Yes	No	No	No	No	No	No
Water Distribution Booster 5 (Gilliam Canyon)	Pendleton	No	Yes	Yes	No	Yes	Yes	no	No	No
Water Distribution Booster 6 (Jr. High)	Pendleton	No	Yes	Yes	No	Yes	Yes	No	No	No
Water Distribution Booster 7 (Mount Hebron)	Pendleton	No	Yes	Yes	No	No	No	No	No	No
Water Distribution Booster 8 (NW 5th)	Pendleton	No	Yes	Yes	No	Yes	Yes	No	No	No
Water Distribution Booster 9 (NW 12th)	Pendleton	No	Yes	Yes	No	Yes	Yes	No	No	No
Water Distribution Booster 10 (Royal Ridge)	Pendleton	No	Yes	Yes	No	Yes	Yes	No	No	No
Water Distribution Booster 11 (SE 7th)	Pendleton	No	Yes	Yes	No	Yes	Yes	No	No	No
Water Distribution Booster 12 (North Hill)	Pendleton	No	Yes	Yes	No	No	No	No	No	No
Water Distribution Booster 13 (SE 20th)	Pendleton	No	Yes	Yes	No	Yes	Yes	No	No	No
Water Distribution Storage Tank 1 (WFP Clearwell)	Pendleton	No	Yes	Yes	No	Yes	Yes	No	No	No
Water Distribution Storage Tank 2 (SouthWest-T1)	Pendleton	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Water Distribution Storage Tank 3 (Airport-T2)	Pendleton	No	Yes	Yes	No	No	No	No	No	No
Water Distribution Storage Tank 4 (SouthHill-T1)	Pendleton	No	Yes	Yes	No	Yes	No	No	No	No
Water Distribution Storage Tank 5 (Skyline-T1)	Pendleton	No	Yes	Yes	No	Yes	No	No	No	No
Water Distribution Storage Tank 6 (Stillman-T1)	Pendleton	No	Yes	Yes	No	Yes	No	No	No	No
Water Distribution Storage Tank 7 (Airport-T2)	Pendleton	No	Yes	Yes	No	Yes	No	No	No	No
Water Distribution Storage Tank 8 (NorthHill-T1)	Pendleton	No	Yes	Yes	No	Yes	No	No	No	No
Water Distribution Storage Tank 9 (SouthHill-T2)	Pendleton	No	Yes	Yes	No	Yes	No	No	No	No
City Hall- City of Pendleton	Pendleton	No	No	Yes	No	No	No	No	No	No
Convention Center- City of Pendleton	Pendleton	No	No	Yes	No	No	No	No	No	No
Fire Station 1- City of Pendleton	Pendleton	No	No	Yes	No	No	No	No	No	No
Fire Station 2- City of Pendleton	Pendleton	No	No	Yes	No	No	No	No	No	No
Fire Station 3- City of Pendleton	Pendleton	No	No	Yes	No	No	No	No	No	No
Airport Terminal- ATC Tower	Pendleton	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Airport - Runways/Taxiways	Pendleton	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Oregon State Police	Pendleton	No	No	Yes	No	No	No	No	No	No
Pendleton Police Department	Pendleton	No	No	Yes	No	No	No	No	No	No

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Milton-Freewater										
Milton-Freewater Private Rural Fire Station	Milton-Freewater	No	No	Yes	No	No	Yes	No	Yes	yes
Umatilla County Road Department –Milton-Freewater	Milton-Freewater	No	No	Yes	No	No	Yes	No	Yes	yes
City Hall	Milton-Freewater	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walla Walla Clinic	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9th Street Bridge	Milton-Freewater	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Eastside Bridge	Milton-Freewater	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MFFD Fire Stations	Milton-Freewater	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water Treatment Plant/ Water Grid/ Storage Tanks	Milton-Freewater	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sewer Treatment Plant/Grid	Milton-Freewater	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Works Equipment Yard	Milton-Freewater	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Community Building	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Safeway	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pilot Rock										
Pilot Rock Water System and Tanks	Pilot Rock	no	no	no	No	no	no	no	no	Yes
Pilot Rock Wastewater Treatment Facility	Pilot Rock	no	no	no	No	no	no	no	no	Yes
Pilot Rock Elementary School	Pilot Rock	no	no	no	No	no	no	no	no	yes
Pilot Rock High School	Pilot Rock	no	no	no	No	no	no	no	no	yes
Main Street Bridge	Pilot Rock	no	no	no	yes	yes	no	no	no	no
Pilot Rock Police Department	Pilot Rock	no	no	no	yes	no	no	no	no	no
Pilot Rock Fire Department	Pilot Rock	no	no	no	no	no	no	no	no	yes
Parks & Recreation Center (used as emergency shelter)	Pilot Rock	no	no	no	no	no	no	no	no	yes
Pilot Rock Market	Pilot Rock	no	no	no	yes	yes	no	no	no	no
J&D's Minimart and Shell Station	Pilot Rock	no	no	no	yes	yes	no	no	no	no
Well #1 – 358 SW Delwood Street	Pilot Rock	No	No	No	Yes	Yes	No	No	No	yes
Well #2 – 547 SW Delwood Street	Pilot Rock	No	No	No	Yes	Yes	No	No	No	yes
Reservoir is ½ mile west of well #1	Pilot Rock	No	No	No	No	No	No	No	No	Yes

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Umatilla										
Port of Umatilla Water Tank	Umatilla	No	No	No	no	No	No	no	Yes	no
Power City Water Co-Op Tower	Umatilla	No	No	No	no	No	No	no	Yes	no
Umatilla Port Water tank	Umatilla	No	No	No	No	No	No	Yes	Yes	No
Umatilla Lind Road Water tank	Umatilla	No	No	No	No	No	No	Yes	Yes	No
McFarland Well / Radio District Tower	Umatilla	No	No	No	No	No	No	Yes	Yes	No
Umatilla Wastewater Treatment Plant	Umatilla	No	No	No	Yes	No	No	No	Yes	No
Umatilla City Hall	Umatilla	No	No	Yes	No	No	No	No	Yes	Yes
Umatilla Police Department	Umatilla	No	No	No	No	No	No	No	Yes	Yes
Umatilla Rural Fire Protection District Station 1	Umatilla	No	No	No	No	No	No	No	Yes	Yes
Umatilla Rural Fire Protection District Station 2	Umatilla	No	No	No	No	No	No	No	Yes	Yes
McNary Dam	Umatilla	No	No	No	Yes	No	No	No	No	No
Three Mile Dam	Umatilla	No	No	No	Yes	Yes	No	No	No	No
Umatilla Post Office	Umatilla	No	No	No	No	No	No	No	No	No
Umatilla Port of Entry	Umatilla	No	No	No	No	No	No	Yes	Yes	Yes
Highway 730 Umatilla River Bridge	Umatilla	No	No	No	Yes	Yes	No	No	No	No
West Extension Irrigation Canal & Pump station	Umatilla	No	No	No	No	No	No	Yes	Yes	No
Port of Umatilla Fuel Farm	Umatilla	No	No	Yes	No	No	No	Yes	Yes	No
McNary Dam	Hermiston (shore facilities in Umatilla's city limits)	No	No	Yes	yes	No	No	no	No	no
Stanfield										
Umatilla County Road Department –in Stanfield	Stanfield	Yes	no	yes	yes	no	yes	yes	yes	yes
Umatilla County Fire District Station 24	Stanfield	no	no	yes	yes	no	no	no	yes	yes
Well #4 and Reservoir #2	Stanfield	yes	no	yes	no	no	yes	no	yes	yes
Well #3	Stanfield	yes	no	yes	yes	no	yes	no	yes	yes
Dunne St Lift Station	Stanfield	yes	no	yes	yes	no	yes	no	yes	yes

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
R.R. Well	Stanfield	yes	no	yes	yes	no	yes	no	yes	yes
Hoosier St Lift Station	Stanfield	yes	no	yes	yes	no	yes	no	yes	yes
Waste Water Plant & Public Works Shops	Stanfield	Yes	no	yes	yes	no	yes	no	yes	yes
Waste Water Effluent site on Hoosier St	Stanfield	yes	no	yes	yes	no	yes	no	yes	yes
Well #5 & Reservoir #3	Stanfield	yes	no	yes	no	no	yes	no	yes	yes
Stanfield Post Office	Stanfield	no	no	yes	no	no	no	no	yes	yes
Stanfield City Hall	Stanfield	no	no	yes	yes	no	no	no	yes	yes
Stanfield Public Library	Stanfield	no	no	yes	yes	no	no	no	yes	yes
Stanfield Police Department	Stanfield	no	no	yes	yes	no	no	no	yes	yes
Ukiah										
Ukiah Sewer Facility	Ukiah	no	no	yes	yes	no	no	no	yes	no
Well House	Ukiah	no	no	yes	no	no	no	no	no	no
Booster Station (Water Tank)	Ukiah	no	no	yes	no	no	no	no	yes	yes
Weston										
Weston MTN Fire Station	Weston	No	No	Yes	No	N	No	Yes	Yes	Yes
Weston City Hall	Weston	No	No	Yes	Yes	No	No	No	Yes	Yes
Sewage Lagoon	Weston	No	No	Yes	No	No	No	Yes	Yes	Yes
Sewer Plant	Weston	No	No	Yes	Yes	No	No	Yes	Yes	Yes
Well and Water Reservoir	Weston	No	Yes	Yes	No	No	No	Yes	Yes	Yes
Weston Library	Weston	No	No	Yes	Yes	No	No	Yes	Yes	Yes
Weston Post Office	Weston	No	No	Yes	Yes	No	No	Yes	Yes	Yes
Weston Handy Mart	Weston	No	No	Yes	No	No	No	Yes	Yes	Yes
Unincorporated Umatilla County										
Umapine Fire Station	Umapine	No	No	Yes	No	No	No	No	Yes	Yes
Tollgate Fire Station	Weston/Tollgate	No	No	Yes	No	No	No	Yes	Yes	Yes
Critical Infrastructure										
Adams										
None										

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Athena										
None										
Confederated Tribes of the Umatilla Reservation (CTUIR)										
Sewer line and treatment facility. The UIR is adjacent to Pendleton. The City of Pendleton provides sewer service to the Umatilla Indian Reservation Mission Community area (unincorporated) via a trunk line connection.	CTUIR/Pendleton	No	Yes	Yes	Yes	No	No	No	No	Yes
Hermiston										
Hinkle Rail Yards	Hermiston	No	No	Yes	Yes	No	Yes	No	No	No
US 395 North	Hermiston	No	No	Yes	No	No	Yes	No	No	Yes
42" Regional Water Line	Umatilla-Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
CalPine Electrical Generating (identified by Hermiston)	Stanfield	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Hermiston Generating (identified by Hermiston)	Stanfield	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Echo										
None										
Helix										
None										
Pendleton										
CHI St. Anthony Hospital	Pendleton	Yes	No	Yes	No	No	No	Yes	No	No
Life Flight Network	Pendleton	Yes	No	No	No	No	Yes	Yes	Yes	Yes
Lifeways Inc.	Pendleton	No	No	No	No	No	No	No	No	No
Eastern Oregon Surgery Center	Pendleton	No	No	No	No	No	No	No	No	No
Pendleton Family Medicine	Pendleton	No	No	No	No	No	No	No	No	No
Umatilla County Dispatch	Pendleton	Yes	No	No	No	No	No	No	No	No
Pendleton Round Up Grounds	Pendleton	No	No	No	No	No	No	No	No	No
ATKORE RMCP	Pendleton	No	No	No	No	No	No	No	No	No

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Auto Clinic	Pendleton	No	No	No	No	No	No	No	No	No
Barhyte Speciality Foods	Pendleton	No	No	No	No	No	No	No	No	No
Baxter Auto Parts	Pendleton	No	No	No	No	No	No	No	No	No
Bi-Mart Corporation	Pendleton	No	No	No	No	No	No	No	No	No
Blue Mountain Community College	Pendleton	No	No	No	No	No	No	No	No	No
Blue Mountain Machine and Welding	Pendleton	No	No	No	No	No	No	No	No	No
Blue MT Lumber Products	Pendleton	No	No	No	No	No	No	No	No	No
Bonneville Power and Administration (BPA)	Pendleton	No	No	No	No	No	No	No	No	No
Byrnes Oil Co. Inc. (Bulk Plant)	Pendleton	No	No	No	No	No	No	No	No	No
Byrnes Oil Co. Inc. (Daves Pac Pride)	Pendleton	No	No	No	No	No	No	No	No	No
Carl Hagglund (Jet A Fuel)	Pendleton	No	No	No	No	No	No	No	No	No
Centurylink	Pendleton	No	No	No	No	No	No	No	No	No
Corley Logging LLC.	Pendleton	No	No	No	No	No	No	No	No	No
D&B Supply Co.	Pendleton	No	No	Yes	No	No	No	No	No	No
Daves 12th St Food Mart	Pendleton	No	No	Yes	No	No	No	No	No	No
East Oregonian Publishing	Pendleton	No	No	Yes	No	No	No	No	No	No
Eastern Oregon Rental and Sales	Pendleton	No	No	Yes	No	No	No	No	No	No
FAA	Pendleton	No	No	Yes	No	No	No	No	No	No
G&R Auto Truck Repair Inc.	Pendleton	No	No	Yes	No	No	No	No	No	No
Grain Craft	Pendleton	No	No	Yes	No	No	No	No	No	No
Hagglund Farms	Pendleton	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No
Hodgen Distributing	Pendleton	No	Yes	Yes	No	No	No	No	No	No
Indian Hills Chevron	Pendleton	No	No	Yes	No	No	No	No	No	No
Intermountain Educational Services Distr.	Pendleton	No	No	Yes	No	No	No	No	No	No
Kelly Lumber Supply Inc.	Pendleton	No	No	Yes	No	No	No	No	No	No
Keystone RV Company	Pendleton	No	No	Yes	No	No	No	No	No	No
Lankford Logging Inc.	Pendleton	No	No	Yes	No	No	No	No	No	No
Lawns Plus	Pendleton	No	No	Yes	No	No	No	No	No	No

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Les Schwab Tire Center	Pendleton	No	No	Yes	No	No	No	No	No	No
Level 3 Communications Inc.	Pendleton	No	No	Yes	No	No	No	No	No	No
Lippert Components Inc.	Pendleton	No	No	Yes	No	No	No	No	No	No
Mid Columbia Producers	Pendleton	No	No	Yes	No	No	No	No	No	No
Mountain View Rv Park LLC.	Pendleton	No	No	Yes	No	No	No	No	No	No
National Weather Service	Pendleton	No	No	Yes	No	No	No	No	No	No
New Cingular Wireless	Pendleton	No	No	Yes	No	No	No	No	No	No
Newly Weds Foods	Pendleton	No	No	Yes	No	No	No	No	No	No
NORCO Inc.	Pendleton	No	No	Yes	No	No	No	No	No	No
Nutrien Ag Solutions	Pendleton	No	No	Yes	No	No	No	No	No	No
O'Reily Auto Parts	Pendleton	No	No	Yes	No	No	No	No	No	No
ODOT	Pendleton	No	No	Yes	No	No	No	No	No	No
Oregon Army National Guard	Pendleton	No	No	Yes	No	No	No	No	No	No
Pacific Corp	Pendleton	No	No	Yes	No	No	No	No	No	No
Pendleton Aviation	Pendleton	No	No	Yes	No	No	No	No	No	No
Pendleton Floors Inc.	Pendleton	No	No	Yes	No	No	No	No	No	No
Pendleton Grain Growers	Pendleton	No	No	Yes	No	No	No	No	No	No
Pendleton Quicky Lube	Pendleton	No	No	Yes	No	No	No	No	No	No
Pendleton Sanitary Service	Pendleton	No	No	Yes	No	No	No	No	No	No
Pendleton School District 16	Pendleton	No	No	Yes	No	No	No	No	No	No
Pine Creek Logging Inc.	Pendleton	No	No	Yes	No	No	No	No	No	No
Pioneer Asphalt Inc.	Pendleton	No	No	Yes	No	No	No	No	No	No
Premium Tire and Lube Inc.	Pendleton	No	No	Yes	No	No	No	No	No	No
RDO Equipment Co.	Pendleton	No	No	Yes	No	No	No	No	No	No
Rod Anderson Construction	Pendleton	No	No	Yes	No	No	No	No	No	No
Sherwin Williams Co.	Pendleton	No	No	Yes	No	No	No	No	No	No
Stangier Auto Supplies	Pendleton	No	No	Yes	No	No	No	No	No	No
The Shop Tire Pros Inc.	Pendleton	No	No	Yes	No	No	No	No	No	No

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Tumallum Lumber Co.	Pendleton	No	No	Yes	No	No	No	No	No	No
Umatilla County Public Works	Pendleton	No	No	Yes	No	No	No	No	No	No
Union Pacific Railroad	Pendleton	No	No	Yes	Yes	No	No	No	No	No
United Pacific	Pendleton	No	No	Yes	Yes	No	No	No	No	No
US Cellular	Pendleton	No	No	Yes	No	No	No	No	No	No
Verison Wireless	Pendleton	No	No	Yes	No	No	No	No	No	No
Walmart	Pendleton	No	No	Yes	No	No	No	No	No	No
Wastern States Equipment Company	Pendleton	No	No	Yes	No	No	No	No	No	No
Wildwood Transport LLC.	Pendleton	No	No	Yes	No	No	No	No	No	No
Woodpecker Truck and Equipmet Inc.	Pendleton	No	No	Yes	No	No	No	No	No	No
WSCO Petroleum Corp.	Pendleton	No	No	Yes	No	No	No	No	No	No
Zollmans Larry Burn Well Drilling	Pendleton	No	No	Yes	No	No	No	No	No	No
Milton-Freewater										
HWY 11	Milton-Freewater	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power Substations/ Power Grid	Milton-Freewater	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pilot Rock										
US 395 South	Pilot Rock/ Ukiah	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Umatilla										
Pacific Corp Transmission	Umatilla	No	No	No	no	No	No	no	Yes	no
Port of Umatilla Docks	Umatilla	No	No	No	yes	Yes	No	no	No	yes
Columbia River Bridge	Umatilla	No	No	No	Yes	Yes	No	Yes	Yes	Yes
Bonneville Power Substation	Umatilla	No	No	No	No	No	No	Yes	Yes	Yes
Highway 395	Umatilla	No	No	No	No	No	No	Yes	No	Yes
Umatilla Footbridge	Umatilla	No	No	No	Yes	Yes	No	Yes	No	No
Stanfield										
Stanfield Rest Stop, I-84	Stanfield	yes	no	yes	yes	no	yes	yes	yes	yes
Stanfield Irrigation District	Stanfield	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes
US 395	Stanfield	yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Ukiah										
OR Highway 244	Ukiah	no	no	yes	no	No3	no	yes	yes	yes
Weston										
None										
Unincorporated Umatilla County										
Bonneville Power Transmission	County Wide	No	No	Yes	No	Yes	No	Yes	Yes	Yes
Umatilla Electric Transmission	County Wide	No	No	Yes	No	Yes	No	Yes	Yes	Yes
Pacificorp Transmission	County Wide	No	No	Yes	No	Yes	No	Yes	Yes	Yes
Interstate 84	County Wide	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interstate 82	West County	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes
OR Highway 207	West County	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes
OR Highway 730	West County	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OR Highway 11	East County	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OR Highway 204	East County	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TransCanada Gas Pipeline	West County	No	No	Yes	Yes	No	No	No	No	No
Vulnerable Population Centers										
Adams										
None										
Athena										
Athena Elementary School	Athena	No	No	Yes	No	No	No	No	Yes	Yes
Weston McEwen High School	Athena	No	No	Yes	No	No	No	No	Yes	Yes
Hermiston										
Geneva House	Hermiston (out of city limits)	Yes	No	Yes	no	No	Yes	no	Yes	yes
Columbia Care Cottage Foster	Hermiston (out of city limits)	Yes	No	Yes	no	No	Yes	no	Yes	yes
TLC at Sandy's Acres	Hermiston (out of city limits)	Yes	No	Yes	no	No	Yes	no	Yes	yes

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Hermiston Terrace	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Guardian Angel	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Aspen Springs	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Sun Terrace	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Hermiston High School	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Armand Larvie Middle School	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Sandstone Middle School	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
West Park Elementary School	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Sunset Elementary School	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Highland Hills Elementary School	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Rocky Heights Elementary School	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Hermiston Christian School	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Hermiston Junior Academy	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Desert View Elementary School	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Ashley Manor Memory Facility	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Rose Arbor Assisted Living	Hermiston	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes
Echo										
None										
Helix –emailed 1/14/21 and 2/1/21										
Helix School	Helix				no			no		yes
Pendleton										
Birch Creek Adult Foster Care	Pendleton	No	No	Yes	No	No	No	No	No	Yes
County Living AFH	Pendleton	No	No	Yes	No	No	No	No	No	Yes
Willobrook Terrace	Pendleton	No	No	Yes	No	No	No	No	No	No
Suttle Care and Retirement	Pendleton	No	No	Yes	No	No	No	No	No	No
Elizabethan Manor	Pendleton	No	No	Yes	No	No	No	No	No	No
Ashley Manor - Athens	Pendleton	No	No	Yes	No	No	No	No	No	No
Juniper House	Pendleton	No	No	Yes	No	No	No	No	No	No

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
McKay Creek Estates	Penldeton	No	No	Yes	No	No	No	No	No	No
Easten Oregon Correction Institution	Pendleton	No	No	Yes	No	No	No	No	No	No
Umatilla County Justice Center	Pendleton	No	No	Yes	No	No	No	No	No	No
Milton-Freewater										
GO School	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Freewater School	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Central School	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mcloughlin High School	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Blue MTN Christian Fellowship Church & School	Milton-Freewater	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Durham's Adult Home Care	Milton-Freewater	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Ferndale Elementary School	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heritage Cottage	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heritage House Foster Care	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heritage Manor	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heritage Villa	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Milton-Freewater Head Start	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SDA School	Milton-Freewater	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Sister's Retirement Inn	Milton-Freewater	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Cascade Assisted Living	Milton-Freewater	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pilot Rock										
City of Pilot Rock Senior Center (shelter)	Pilot Rock	no	no	no	yes	yes	no	no	no	no
Umatilla										
Umatilla High School	Umatilla	Yes	No	No	Yes	No	No	Yes	No	No
Umatilla Middle School	Umatilla	Yes	No	No	Yes	No	No	Yes	No	No
Umatilla Grade School	Umatilla	Yes	No	No	No	No	No	No	No	No
Lifeways	Umatilla	Yes	No	No	No	No	No	No	No	No
Umatilla Community Center	Umatilla	Yes	No	No	No	No	No	No	No	No
Morman Church	Umatilla	Yes	No	No	No	No	No	No	No	No

Umatilla County Natural Hazards Mitigation Plan Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers										
Umatilla County Asset Identification	**Nearest Community**	**Air Quality**	**Drought**	**Earthquake**	**Flood**	**Landslides/ Debris Flows**	**Volcano**	**Wildfire**	**Summer Storm**	**Winter Storms**
Assembly of God Church	Umatilla	Yes	No	No	No	No	No	No	No	No
Baptist Church	Umatilla	Yes	No	No	No	No	No	No	No	No
Presbyterian Church	Umatilla	Yes	No	No	No	No	No	No	No	No
The Links - Assisted Living	Umatilla	Yes	No	No	No	No	No	No	No	No
Stanfield										
Stanfield Middle/High School	Stanfield	no	no	yes	no	no	no	no	yes	yes
Stanfield Elementary	Stanfield	no	no	yes	no	no	no	no	yes	yes
Crossroads Community Church	Stanfield	no	no	yes	yes	no	no	no	yes	yes
Baptist Church	Stanfield	no	no	yes	yes	no	no	no	yes	yes
Presbyterian Church	Stanfield	no	no	no	yes	no	no	no	yes	yes
Stanfield Community Center	Stanfield	no	no	no	yes	no	no	no	yes	yes
Old Stanfield High School (E Coe Ave)	Stanfield	no	no	no	no	no	no	no	yes	yes
Ukiah										
None										
Weston										
Weston Middle School	Weston	No	No	Yes	No	No	No	No	Yes	Yes
Unincorporated Umatilla County										
Stanfield Hutterian Settlement	West County	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes

Source: DLCD Natural Hazards Planner, Tricia Sears, and the Umatilla County NHMP Steering Committee, 2020-21.

Key Observations of Critical /Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers

- It is critical to maintain the quality of built capacity (transportation networks, critical facilities, utility transmission, communication, etc.) throughout the area. For example, if service on Highways 395 and 84 were interrupted for an extended period of time that would be problematic to most of the cities and unincorporated areas.
- Some roads and bridges in the County are highly vulnerable to hazards. Because roads bridges vary in size, materials, siting, and design, any given hazard will affect them differently. The County may want to devote attention to roads and bridges that may become obstructed that serve as primary interstate travel routes, as this will likely have significant impacts on access in and out of the County and region.
- U.S. Census data shows 27,538 housing units, with 17,518 owner-occupied and 10,020 renter-occupied in Umatilla County. Of those, the bulk were built many years ago, before seismic and flood requirements. See Table 2-8 included below.[44]
- Current seismic building standards began in 1990 and the local implementation of the flood elevation requirements began in the 1970's. The Umatilla County Flood Insurance Rate Maps (FIRMs) are dated September 3, 2010. The Flood Insurance Study has been completed for the FIRMs that became effective September 3, 2010. The FIS brought together all of the County and incorporated cities and the Confederated Tribes of the Umatilla Reservation (CTUIR). Umatilla County's website includes a list of the Letter of Map Changes (LOMC) issued. These documents will modify the FIRM Panels and will affect flood insurance for the parcels involved. Therefore, the documents are important to keep track of and on file in case there is any question as to the status of flooding on the affected parcel(s).[45]
- Work on Memorandums of Understanding or Memorandums of Agreement with other agencies and organizations to have access to and share resources.
- Continue to consider impacts to vulnerable communities throughout Umatilla County.

Table 2-8 Housing Units in Umatilla County

Period of Time	Number of Units Constructed
2014 or later	1,164
2010 to 2013	445
2000 to 2009	2,840
1980 to 1999	7,430
1960 to 1979	7,641
1940 to 1959	4,781
1939 and before	3,237
Total	27,538

Source: U.S. Census Bureau, American Community Survey, Table S2504, *Physical Housing Characteristics for Occupied Housing Units*, 2019 ACS 1-Year Estimates Subject Tables, https://data.census.gov/cedsci/table?q=S2504&g=0500000US41059&tid=ACSST1Y2019.S2504&hidePreview=false, accessed 1/7/21

[44] U.S. Census Bureau, American Community Survey, Table S2504, *Physical Housing Characteristics for Occupied Housing Units*, 2019 ACS 1-Year Estimates Subject Tables, https://data.census.gov/cedsci/table?q=S2504&g=0500000US41059&tid=ACSST1Y2019.S2504&hidePreview=false, accessed 1/7/21

[45] Umatilla County, the *National Floodplain Insurance Program (NFIP)*, http://www.co.umatilla.or.us/planning/floodhazard.htm, accessed 1/7/21

Umatilla County Risk Assessment and Community Resilience

The information presented in this Risk Assessment, along with hazard specific information in Volume II Hazard Annexes and the other information in the appendices, is provided as the basis for the mitigation actions in Section 3 Mitigation Strategy in Table 3-1. The mitigation actions in this *2021 Umatilla County NHMP* are ways for Umatilla County, the Cities, and the Special Districts to prepare for and to mitigate the short- and long-term effects resulting from natural hazards. This NHMP and the mitigation actions create tools and actions to build community resilience.

Community resilience is a term often used in a variety of forums, and many definitions abound. From the City Club of Portland, this definition describes, "A resilient community, city or region understands its strengths and vulnerabilities and has developed capabilities to plan for and mitigate the impact of a major earthquake or other disaster, rapidly restore itself to a state of basic well-being, and rebuild to achieve even greater resilience."[46]

Disaster resilience is another common term. "The thing that may distinguish community resilience from broader definitions of disaster resilience efforts is the explicit focus on the risks, needs and resources specific to a given community. Community resilience also includes a focus on incorporating equity and social justice considerations in preparedness planning and response. From a planning perspective, community resilience planning is a bottom-up, rather than a topdown mode of thinking because priorities are likely to be very different when resilience is approached from the perspective of the impacted community as opposed to the state as a whole."[47]

As is demonstrated with the variety of mitigation actions for the identified natural hazards, there are many actions communities can take to build their resilience. According to the Energy Trust of Oregon, "Energy concerns are a vital component of the community resilience equation, because energy powers communities, making modern life possible. Energy efficiency and distributed renewable energy are essential components of any resilience strategy because they aid emergency response and recovery, help with climate change adaptation and mitigation and provide social and economic benefits. They can also help protect communities from the impacts of emerging threats, such as politically motivated cyberattacks on power plants and electric systems. Whatever the threat, energy efficiency and distributed renewables help reduce vulnerability to the diverse hazards a community may face and increase the community's capacity to cope with the damage."[48]

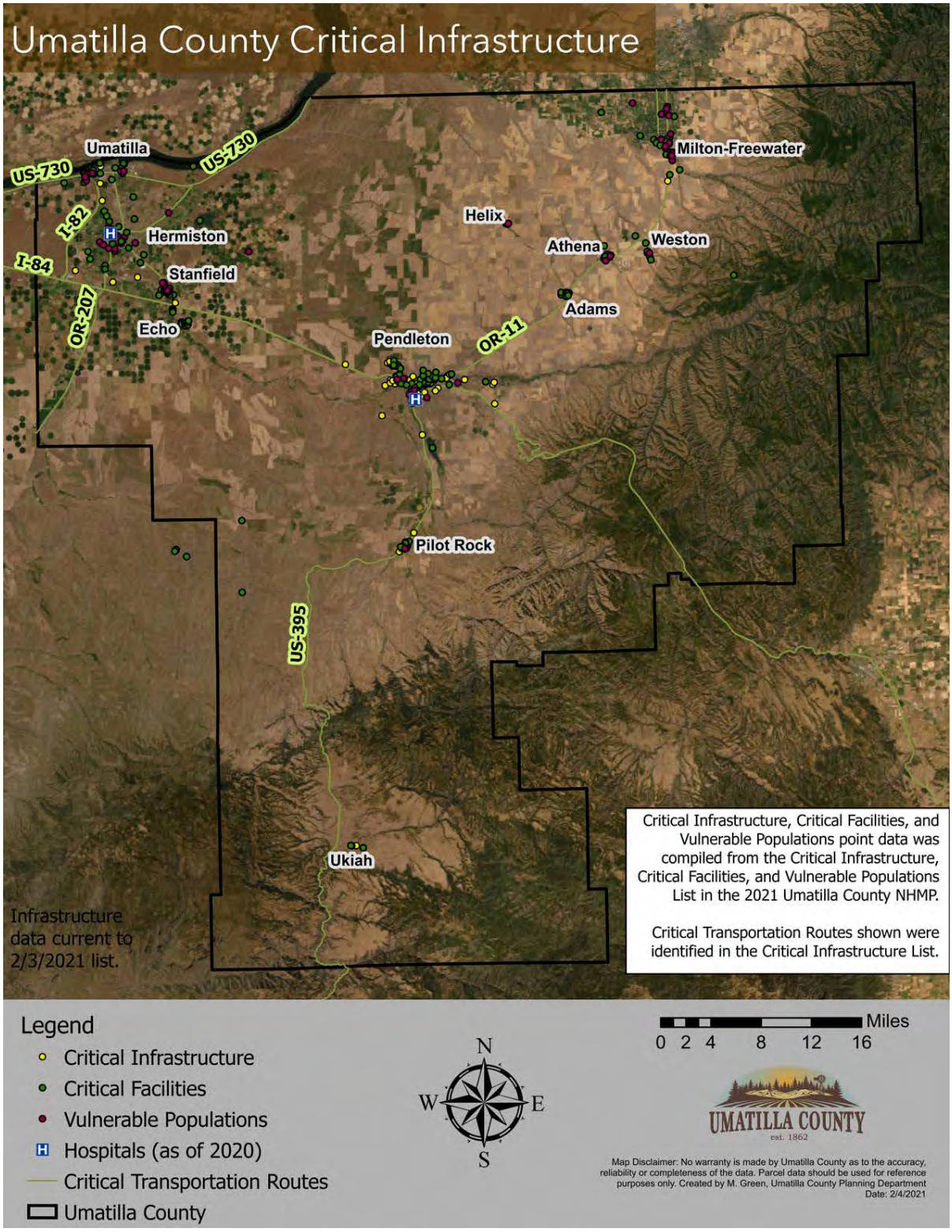
In this *2021 Umatilla County NHMP*, the NHMP Steering Committee recognizes the role energy plays in keeping communities resilient and critical infrastructure functioning. Below, Figure 2-5 is the Critical Infrastructure Map. See Appendix B Community Profile for Figure B-25 the Utility Service Area. These maps, along with other maps, supplement the text in this Section 2: Risk Assessment and the text in Appendix B Community Profile. In Appendix B, the utility service providers are described.

[46] Energy Trust of Oregon, *Community Resilience Board Learning Paper*, Prepared by Lizzie Rubado, Jessica Iplikci, and Becky Engle, April 2018

[47] Ibid.

[48] Ibid.

Figure 2-5 Critical Infrastructure Map



Source: Megan Green, Umatilla County, 2/4/21

Section 3: Mitigation Strategy

Section 3 outlines Umatilla County's strategy to reduce or avoid short- and long-term vulnerabilities to the identified natural hazards. Specifically, this section presents a mission, goals, and mitigation actions thereby addressing the mitigation strategy requirements contained in 44 CFR 201.6(c). The Umatilla County Natural Hazards Mitigation Plan (NHMP) Steering Committee reviewed and revised the mission; reviewed and retained the goals as is; and reviewed and updated mitigation actions. Additional planning process documentation is in Appendix A.

Mitigation Plan Mission

The plan mission states the purpose and defines the primary functions of Umatilla County's Natural Hazard Mitigation Plan. It is intended to be adaptable to any future changes made to the plan and need not change unless the community's environment or priorities change.

The **mission** of the Umatilla County NHMP is to:

Mission:

To prevent loss and protect life, property, and the environment from natural hazards through coordination and cooperation among public and private partners. To mitigate the impacts of natural hazards and to increase the resilience of our community in our efforts to protect life, property, and the environment.

The 2020-2021 Umatilla County NHMP Steering Committee reviewed the existing NHMP mission statement and agreed it needed to be updated to more accurately describe the overall purpose and intent of this NHMP. The Steering Committee believes the mission statement allows for a comprehensive approach to mitigation planning.

Mitigation Plan Goals

Mitigation plan goals are more specific statements of direction that Umatilla County citizens, and public and private partners can take while working to reduce the County's risk from natural hazards. These statements of direction form a bridge between the broad mission statement and particular mitigation actions. The goals listed here serve as checkpoints as agencies and organizations begin implementing mitigation actions. These

Public participation was a key aspect in this update to the NHMP. The 2020-2021 Umatilla County NHMP Steering Committee reviewed the six existing NHMP goals and determined they would keep the goals as is for this update; all the goals are of equal importance.

The **goals** of Umatilla County NHMP are:

Goal 1: Protect life and property.

Goal 2: Public outreach.

Goal 3: Planned prevention.

Goal 4: Agency/citizen coordination.

Goal 5: Natural resource protection.

Goal 6: Emergency service planning.

Existing Mitigation Activities

Existing mitigation actions include current mitigation programs and activities that are being implemented by Umatilla County in an effort to reduce the community's overall risk to natural hazards. Documenting these efforts can assist the jurisdiction to better understand risk and identifying successes. See Table 3-1 2021 Umatilla County NHMP Mitigation Actions and Table 3-2 Umatilla County Mitigation Actions 2014 Status. For details on each natural hazard see the Volume I Risk Assessment and the Volume II Hazard Annexes.

Government Structure

In addition to the Emergency Management Department, most departments within the County and City governance structures have some degree of responsibility in building overall community resilience. Each plays a role in ensuring that jurisdiction functions and normal operations resume after an incident, and the needs of the population are met. For further explanation regarding how these departments influence hazard resilience, see Appendix B, Community Profile.

Existing Plan & Policies

Communities often have existing plans and policies that guide and influence land use, land development, and population growth. Linking existing plans and policies to the Natural Hazards Mitigation Plan helps identify what resources already exist that can be used to implement the action items identified in the Plan. Plans and policies already in existence have support from local residents, businesses and policy makers.[1] A list documenting plans and policies already in place in Umatilla County and participating Cities can be found in Appendix B, Community Profile.

Community Organizations and Programs

Communities often have existing plans and policies that guide and influence land use, land development, and population growth. Linking existing plans and policies to the NHMP helps identify what resources already exist that can be used to implement the mitigation actions in the NHMP. Plans and policies already in existence have support from local residents, businesses and policy

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

makers.[2] A list documenting plans and policies already in place in Umatilla County and the Cities can be found in Section 4 Implementation Table 4-1 and Appendix B Community Profile in Table B-20.

NHMP Mitigation Actions

Mitigation actions identified through the planning process are an important part of the NHMP. Mitigation actions are detailed recommendations for activities that local departments, citizens, and others could engage in to reduce risk. They address both multi-hazard (MH) and hazard-specific issues. Mitigation actions can be developed through a number of sources. A description of how Umatilla County's 2021 NHMP mitigation actions were developed is provided below in the "Mitigation Action Development Process" section. The process resulted in the creation of two mitigation actions tables.

- Table 3-1, 2021 Umatilla County NHMP Mitigation Actions shows the mitigation actions to move forward with this *2021 Umatilla County NHMP*.
- Table 3-2, Umatilla County's Mitigation Actions 2014 Status provides an update on the status of each mitigation action from the *2014 Umatilla County NHMP*.

Mitigation Action Development Process

Development of mitigation actions was a multi-step, iterative process that involved brainstorming, discussion, review, and revisions. The bulk of this work occurred during the third, fourth, and fifth Steering Committee meetings which were held on November 17, 2020, December 15, 2020, and January 26, 2021. Additional conversation occurred with the Planning Director, Emergency Manager, and DLCD's Natural Hazards Planner.

One of the first steps was to discuss the status of the mitigation actions from the *2014 Umatilla County NHMP*. The Steering Committee went through each mitigation action and ascertained if the action was completed or in progress.

- *Completed mitigation actions* were deemed a successful accomplishment and removed from the table.
- *No longer included mitigation actions* were removed from the table due to resource constraints or other factors.
- *Mitigation actions that were retained* were retained in full or modified to more accurately reflect the current situation.
- During this process, *new mitigation actions* were also identified.

With the new mitigation actions and the retained existing mitigation actions (some of which were modified), a table was created to include all the mitigation actions that would be moved forward for the *2021 Umatilla County NHMP*; see Table 3-1, 2021 Umatilla County NHMP Mitigation Actions. It includes the mitigation actions that the NHMP Steering Committee supports.

Table 3-2 is the Umatilla County Mitigation Actions 2014 Status; it provides an update on the status of each mitigation action from the *2014 Umatilla County NHMP*.

[2] Raymond J. Burby, *Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities*, 1998, https://www.nap.edu/catalog/5785/cooperating-with-nature-confronting-natural-hazards-with-land-use-planning

Mitigation Actions

Each mitigation action for this *2021 Umatilla County NHMP* is listed with the mitigation action title and description, the coordinating organization, the partner organizations, the timeline, and the NHMP goals that it aligns with. For the status update of the mitigation actions, there are additional columns that show the status/what has been done, and whether the mitigation action from 2014 was to be retained, modified, or deleted.

Mitigation Action Title Description

Each mitigation action item includes a title, e.g. short-term multi-hazard mitigation action #2, and a brief description of the proposed action.

Alignment with Plan Goals

The plan goals addressed by each mitigation action are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation.

Coordinating Organization

The coordinating organization is the public agency with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation. The coordinating organization is Umatilla County and the main contact is Tom Roberts, Emergency Manager, and Bob Waldher, Planning Director.

Partner Organizations

The partner organizations are listed in the mitigation actions tables included below. There are potential partners recommended by the Steering Committee but not necessarily contacted during the development of the plan. The coordinating organization should contact the identified partner organizations to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the mitigation actions.

Timeline

Mitigation actions include both short- and long-term activities. Each action item includes an estimate of the timeline for implementation.

- *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to two years.
- *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement.
- *Ongoing* action items signify that work has begun and will either exist over an indefinite timeline, or an extended timeline. These are successful mitigation actions that have often been well integrated into the practices of the jurisdiction.

Status

As mitigation actions are implemented or new ones are created during the plan maintenance process, it is important to indicate the status - whether it is new, ongoing, or complete. Documenting the status of the mitigation action will make reviewing and updating the NHMP easier during the plan's five-year update, and can be used as a benchmark for progress.

Mitigation Rationale

Mitigation actions should be fact-based and tied directly to issues or needs identified throughout the planning process. Mitigation actions can be developed at any time during the planning process and can come from a number of sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment. The rationale for proposed mitigation actions is based on the information documented in Volume I Section 2 Risk Assessment and Volume II Hazard Annexes.

Potential Funding Sources

Where possible, identify potential funding sources for the mitigation action. Example funding sources can include: the Federal Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC), and Flood Mitigation Assistance (FMA) Programs; state funding sources such as the Oregon Seismic Rehabilitation Grant Program; or local funding sources such as capital improvement or general funds. A mitigation action may have multiple funding sources. The mitigation actions are identified as short- or long-term as described in the "Timeline" description included previously, and as listed in the two mitigation action tables below. That categorization includes an element of funding capacity of the jurisdiction for that action. See the Appendix D Grant Programs and Resources for additional information on funding opportunities.

Implementation through Existing Programs

The *2021 Umatilla County NHMP* includes a range of mitigation actions that, when implemented, will reduce loss from hazard events in the County. Within the NHMP, FEMA requires the identification of existing programs that might be used to implement these action items. Umatilla County and the Cities currently address statewide planning goals and legislative requirements through their comprehensive land use plans, capital improvements plans, mandated standards and building codes. Plans and policies already in existence have support from local residents, businesses, and policy makers. Many land use, comprehensive, and strategic plans are updated regularly, and can adapt easily to changing conditions and needs. Implementing the NHMP's mitigation actions through such plans and policies increases their likelihood of being supported and implemented. The jurisdictions will work to incorporate the mitigation actions into existing programs and procedures.

Umatilla County and the Cities will continue to coordinate and implement the *2021 Umatilla County NHMP* with the monitoring, evaluating, and updating of the NHMP within a 5-year cycle, through the NHMP maintenance meetings. Those meetings may be held with the group referred to as the Emergency Action Committee, led by Umatilla County. The mitigation actions refer to the NHMP Steering Committee and the Emergency Action Committee.

Mitigation Action Tables

The Mitigation Actions Tables portray the overall action plan framework and identify links between the plan goals, partnerships (coordination and partner organizations), and actions. The tables document a description of the action, the level of priority, the coordinating organization, partner organizations, timeline, and the plan goals addressed.

Table 3-1, 2021 Umatilla County NHMP Mitigation Actions, shows all nine of the natural hazards – severe winter storms, severe summer storms, earthquakes, droughts, floods, volcanic events, wildfire, landslides/debris flows, and air quality - impacting Umatilla County and the Cities have mitigation actions. There are hazard specific and multi-hazard mitigation actions.

Table 3-2, Umatilla County Mitigation Actions 2014 Status, includes the status and explanation of the *2014 Umatilla County NHMP* mitigation actions as provided by the Umatilla County NHMP Steering Committee (SC) at NHMP meetings in 2020-2021. The decisions to retain, modify, or delete the mitigation actions were also discussed at the meetings. Follow up discussions occurred with SC members by email and phone calls. This table has been refined so as to include an overall summary from the discussions.

The NHMP Steering Committee finalized the mitigation actions for the *2021 Umatilla County NHMP* and determined the factors for prioritizing them. It was agreed that the risk level rankings from the Hazard Vulnerability Assessment (HVA) would be used as a way to prioritize the multi-hazard and hazard-specific mitigation actions. The "Priority" column lists the priority. All the multi-hazard (MH) actions are high priority. The hazard-specific actions are high, medium, and low. The risk level rankings are found in Volume I Section 2 Risk Assessment in Table 2-4 and the rankings are further described in the Risk Assessment section.

Number of mitigation actions in the 2021 Umatilla County NHMP: 80 (as of 5/24/21)

Number of existing mitigation actions by hazard: multi-hazard = 24, wildfire = 10, flood = 23, severe summer storms and severe winter storms = 7, earthquake = 2, volcano = 1, landslide/debris flows = 2, drought = 3, and air quality = 8 (new in the *2021 Umatilla County NHMP*).

Table 3-1 Umatilla County Multi-Jurisdictional NHMP Mitigation Actions

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
Multi-Hazard (MH) Actions: High Priority							
Short-Term MH #1	Develop and implement a public awareness campaign regarding natural hazards and natural hazards safety and tools to achieve disaster resistance. Emphasize outreach with and about vulnerable populations. Build relationships and collaboration with utilities. Refer to the Umatilla County NHMP Natural Hazards Outreach Calendar in the appendices of the *2021 Umatilla County NHMP* for hazards to focus outreach efforts on each month, as well as partners to collaborate with.	Umatilla County Emergency Management (UCEM)	OPDR, FEMA, OEM, ODOT, NWS, ACOE, Fire Corps, Citizen Groups, Cities, Clearview Disability Resource Center, Pacific Power, Umatilla Electric Co-op, utilities, CTUIR Note: ORS 401.305 regarding county and city emergency management	On-going	1-5	Actively worked on each year. UCEM has done outreach. Darrin from Clearview noted they have done outreach to folks about how to interact with vulnerable populations.	Retain and modify. Add Pacific Power and Umatilla Electric Co-op as partners. Add language on this one specific to vulnerable population outreach. Need to ascertain best ways to reach vulnerable populations "take the table to them." Add language about outreach efforts with utilities.
Short-Term MH #2	Maintain Storm Ready Community designation for Umatilla County. Work with Cities and Tribes to have them become Storm Ready Communities.	UCEM	NOAA/NWS, response agencies, Cities, Tribes, utilities	2 years	2, 4	Umatilla County is a Storm Ready Community. This must be renewed every 3 years; due for renewal in 2021.	Retain and modify. Cities and Tribes can be Storm Ready Rating Communities. Revise language to include them.
Short-Term MH #3	Provide bilingual publications about emergency preparedness and natural hazard awareness and conduct targeted outreach with Hispanic community.	UCEM	NOAA/NWS, Cities	2 years	1-6	New mitigation action	New mitigation action

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
Short-Term MH #4	At least twice per year at the Emergency Action Committee meetings (led by Umatilla County), review and discuss the *2021 Umatilla County NHMP* mitigation actions. At the meetings that the NHMP is discussed, invite the 2020-2021 Umatilla County NHMP Steering Committee.	UCEM and Umatilla County Planning	Cities	2x/year	1-6	New mitigation action	New mitigation action
Long-Term MH #1	Utilize central location of Umatilla County EOC to create an emergency management and information hub for NE Oregon.	UCEM	Counties, Cities, response agencies, private EM crews, FEMA, OEM, ARC, ODOT, ODF, DOGAMI, DSL, USACE, USFS, CTUIR	5-12 years	1-6	Many discussions have occurred. However, at this time it is unlikely that OEM will officially designate the Umatilla County EOC specifically as a regional hub.	Retain and modify. Keep focus on the region of NE Oregon.
Long-Term MH #2	County GIS staff are a hub for GIS information, including map generation and details on hazard prone areas. Information will be shared with and assistance provided to Cities as much as possible.	Umatilla County Planning	UCEM, CTUIR, DOGAMI, ODOT, utilities and transmission companies, FEMA, OEM, Cities, DLCD	On-going	1, 3-6	Accomplished. Planning Dept. has a planner with GIS skills. There is a GIS coordinator in Records.	Retain and modify. Cities like Umatilla have GIS capability in house but cities like Echo do not. Emphasize that County is a hub for data and assistance.
Long-Term MH #3	Umatilla County will explore disaster/ resilience planning around historic resources. Review the Oregon Heritage State Historic Preservation Office website on Disaster	Umatilla County Planning	UCEM, Cities, Oregon Heritage State Historic Preservation Office	5 years	1-6	New mitigation action	New mitigation action

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
	Preparedness, Recovery, and Resilience https://www.oregon.gov/oprd/OH/Pages/DisasterPrep.aspx. Summarize the information and potential ways to implement it in Umatilla County.						
Long-Term MH #4	Create a list of substandard access roads. Prioritize the roads on the list for the purpose of bringing roads up to current fire and life safety standards. Seek funding to upgrade the roads.	Umatilla County: Planning, Public Works, and Emergency Management	ODOT, CTUIR, OEM, ODF, USFS	5-10 years	1-4,-6	Bob says County Public Works has a list of roads and bridges; they will work to inventory and prioritize them.	Retain and modify. Moved to Long-Term MH as #4 instead of Long-Term WF. Renumber the Long-Term WF mitigation actions. Access roads are key for many hazards, not just wildfire.
Long-Term MH #5	Purchase two portable back-up generators.	Stanfield	Umatilla County, Energy Trust, funding sources	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #6	Purchase a bucket truck.	Stanfield	Umatilla County, funding sources	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #7	Purchase a front wheel loader.	Stanfield	Umatilla County, funding sources	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #8	Communication: Assist with change of Public Works SCADA.	Pendleton	Umatilla County, CTUIR	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #9	ICS: Command Center upgrades at Fire Station #1 for future emergency response.	Pendleton	Umatilla County, OEM	5 years	1-6	New mitigation action	New mitigation action

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
Long-Term MH #10	ICS: Automatic transfer switch for generator at City Hall for use as command post.	Pendleton	Umatilla County	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #11	ICS: Training for staff that is position specific.	Pendleton	Umatilla County, OEM, FEMA	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #12	To improve redundancy, obtain back-up generators at key booster stations with automatic transfer switch.	Pendleton	Umatilla County, Energy Trust	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #13	Purchase back-up generators for water system wells.	Milton-Freewater	OEM, FEMA	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #14	Purchase back-up generators for emergency communications system.	Milton-Freewater	OEM, FEMA	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #15	Purchase back-up generators for fire stations #1 and #2.	Milton-Freewater	OEM, FEMA	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #16	Purchase sandbag filling station.	Milton-Freewater	OEM, FEMA	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #17	Purchase back-up generators for Public Works Building.	Milton-Freewater	OEM, FEMA	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #18	Purchase back-up generators for wastewater system lift stations.	Milton-Freewater	OEM, FEMA	5 years	1-6	New mitigation action	New mitigation action

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
Long-Term MH #19	ICS Command Center/ EOC upgrades at library for future emergency use.	Milton-Freewater	OEM, FEMA	5 years	1-6	New mitigation action	New mitigation action
Long-Term MH #20	Discuss with EOTEC the use of the Umatilla County fairgrounds as a large scale evacuation center. Discuss possible upgrades to the RV park, the Event Center, and Animal Areas. Develop plans to design, fund, and implement the upgrades.	Umatilla County Emergency Management (UCEM) and Eastern Oregon Trade and Event Center (EOTEC)	City of Hermiston, Clearview Disability Resource Center, CTUIR, OEM, FEMA,	Short term and long term steps. Short term: secure agreements and perform assessment. Long-term: stage supplies and plan for potential upgrades and grant applications.	1-6	New mitigation action	New mitigation action
Wildfire (WF) Actions: High Priority							
Short-Term WF #1	Work with agriculture and conservation groups to establish fire buffers between both forest and range wildland urban interface areas.	Fire Defense Board	OEM, NRCS, ODA, USDA, SWCD, UCEM, agricultural community, UCEM, ODF, local fire districts	3-5 years	1-5	In process. Discussion noted the Governor's Wildfire Council's recommendations. Also that ODF works with County and Fire Defense Board on this.	Retain. Add partner organizations.
Short-Term WF #2	Seek funding for additional UCEM staff. The new staff focus on all hazards, including fire prevention planning and education.	UCEM	ODF, USFS, CTUIR, response agencies, private fire companies	1-2 years	1-5	Tom is working on getting funding for two positions at UCEM. One position would have responsibility for fire	Retain and modify.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
						prevention planning and education.	
Short-Term WF #3	Obtain local fire location GIS data for Umatilla County from the Oregon State Fire Marshal's Office.	Umatilla County Planning and UCEM	Umatilla County Fire District #1, fire districts in Umatilla County, Oregon State Fire Marshal's Office, DLCD	2-3 years	1-6	New mitigation action	New mitigation action
Long-Term WF #1	Work with people in Umatilla County to provide fire protection throughout the County via rural, forest, or rangeland fire districts and other applicable fire districts.	UCEM	ODF, UCEM, CTUIR, BLM, USFS, BOC, Cities	next 5 years	1-2, 4-6	In process.	Retain and modify. ODF staff notes much of Umatilla County is not in a rural fire district. Working to add areas to fire districts.
Long-Term WF #2	Complete feasibility studies of biomass potential on forest lands. Create incentive funding to test biomass technology in Umatilla County.	Umatilla County Economic Development	ODF, USFS, OECDD, State of Oregon, OEM, FEMA, Greater Eastern Oregon Development Corporation (GEODC)	5-10 years	1-6	No progress on the biomass feasibility studies. ODF noted that they have a Cohesive Wildfire Strategy Coordinator position that is cooperatively funded in NE Oregon.	Retain. There are three CWPPs in Umatilla County: Blue Mountain Foothills Region CWPP, West County CWPP, and the Mill Creek OR & Walla Walla WA CWPP These need to be updated.
Long-Term WF 3	Support removal/ reduction of biomass fire hazards on private and public lands.	ODF	UCEM, USFS, State of Oregon	On-going	1-2, 4-6	Matt and Tom note ODF fuels reduction has been done. Funding from ODF can be obtained for that work. NRCS also has potential funding sources.	Retain. Governor's Wildfire Council recommendations from November 2019 provides info.https://www.oregon.gov/gov/policy/Pages/wildfirecouncil.aspx

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
Long-Term WF #4	Develop upland storage ponds for wildlife benefit and to be used during wildland fire suppression efforts.	ODFW, ODF	UCEM, OWRD, DSL, CTUIR, landowners, fire districts, Special Districts, Cities, WWBWC	On-going	1-2, 4-6	On-going	Retain
Long-Term WF #5	Develop and adopt county wildfire safety standards for development in forested areas zoned residential.	Umatilla County Planning Department	UCEM, ODF, fire districts, landowners	3-5 years	1-4, 6	New mitigation action	New mitigation action
Long-Term WF #6	Fire training facility and grounds.	Pendleton	Umatilla County, CTUIR	5 years	1-6	New mitigation action	New mitigation action
Long-Term WF #7	Construct a new fire station in Weston.	East Umatilla Fire & Rescue District	City of Weston, Energy Trust	1-3 years	1-6	New mitigation action	New mitigation action
Flood (FL): High Priority							
Short-Term FL #1	Develop conservation easements and riparian plantings within mapped and unmapped floodplain areas and farmland with highly erodible soils.	Watershed councils such as the Walla Walla River Basin Watershed Council	UCSWCD, NRCS, ODA, USDA, CTUIR, Wheat League, Blue Mountain Land Trust, Riverside – Mission Water Control District, Milton-Freewater Water Control District, Walla Walla River Irrigation District, Stanfield Irrigation District, Hermiston Irrigation District, Westland Irrigation District,	1-5 years	1-5	Work is on-going. Work has been done and will continue with watershed councils and UCSWCD. Bank stabilization and restoration or priority actions. Post 2019 flood recovery group has been working on that. UCSWCD is leading that. The post 2020 flood recovery group that will work on this too.	Retain and modify.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
			Teel Irrigation District, West Extension Irrigation District, Gardena Farms Irrigation District, Hudson Bay District Improvement Co, FEMA, USACE, USDA				
Short-Term FL #2	Identify areas able to absorb high-velocity streamflows w/o impacting investments (i.eg. re-establish or create artificial floodplains). Establish connectivity and diversion infrastructure to be utilized during high water events to divert high water to these areas.	NRCS, UCSWCD, WWBWC	UBWC, CTUIR, ODFW, USFWS, BOR, USACE, special districts, landowners	1-5 years	1-5	Watershed councils and irrigation districts have worked to remove two dams -Brownell Dam and Dillon Dam- on the Umatilla River.	Retain.
Short-Term FL #3	Maintain the database of all landowners within the FEMA Special Flood Hazard Areas in the County. Continue outreach throughout the community, in unincorporated areas and in cities, regarding floods and flood insurance. Use AlertSense for emergency notices and information sharing as appropriate.	Umatilla County Planning and UCEM	County, FEMA, OEM, Cities, DLCD, NWS, UCSWCD, Watershed Councils	On-going	2-4	They have an inventory of properties in the floodplain. They have not done a mailer to each property. They do outreach out floods and flood insurance. Outreach on-going from Planning and from UCEM.We use AlertSense and have the capability to access iPaws and WEA through it. These capability's combined give us either subscription based	Retain and modify. Having a collaboration using the skills and tools of both the Planning and Emergency Management Departments provides excellent information and tools to people in unincorporated areas and incorporated cities.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
						notifications and/or for targeting as well as county wide. We also have cross county capacity within AlertSense with Morrow Co (and discussing possibility future cross Co with Grant and Union) so we can activate one another's systems if necessary.	
Short-Term FL #4	Aerial mapping of Umatilla River, including impacts to levees.	Pendleton, USACE	DLCD	Begin in 2021	1-6	New mitigation action	New mitigation action
Short-Term FL #5	Work with FEMA to correct the FEMA maps related to McKay Creek.	Pendleton, FEMA, USACE	DLCD		1-6	New mitigation action	New mitigation action
Short-Term FL #6	McKay Creek watershed basin analysis and alert system evaluation for the McKay Creek Dam.	Pendleton	DLCD, Bureau of Reclamation, USACE Silver Jackets		1-6	New mitigation action	New mitigation action
Short-Term FL #7	Mapping the Umatilla River with drones. Developing a management plan for the river.	Echo, NRCS, UCSWCD	DLCD		1-6	New mitigation action	New mitigation action
Short-Term FL #8	Channel Migration Study for Umatilla River and Lower McKay Creek	DOGAMI	Umatilla County, Pendleton, Echo, Stanfield, Hermiston, Umatilla, CTUIR, ODOT, landowners	2 years	1-6	New mitigation action	New mitigation action

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
Short-Term FL #9	McKay Creek Bank Stabilization	Pendleton	UCSWCD, McKay Creek Water Control District, Umatilla County	2-3 years	1-6	New mitigation action	New mitigation action
Long-Term FL #1	The Planning, Emergency Management, and Public Works staff collaborate to identify and map areas not on the FEMA FIRM maps that are susceptible to high water and flash flood events. Identify and map roads and infrastructure in these areas.	Umatilla County Planning	UCEM, GIS, FEMA, DSL, USACE, CTUIR, OEM, response agencies, NOAA, Umatilla County Public works	5 years	1-4	Tom and Bob have noted several areas prone to floods that are not identified on flood maps.	Retain and modify. Planning, Emergency Management, and Public Works need to collaborate on this one.
Long-Term FL #2	Make a list of existing berms and levees in Umatilla County. Identify the ownership/sponsorship (who is responsible for the operation and maintenance of the levee or berm?). Evaluate the status of the levees (do they meet USACE standards?). Prioritize the list related to repair or replacement. Seek funding for the repair and replacement work.	Cities	FEMA, OEM, USACE, DSL, CTUIR, ODFW, special districts, Umatilla County Planning, Umatilla County, Emergency Management Umatilla County Public Works, Cities, Silver Jackets, Milton-Freewater Flood Control District	5 years	1-4	No work occurred on the list since the *2014 Umatilla County NHMP*. Milton-Freewater recertified their levee.	Retain and modify.
Long-Term FL #3	Identify public and private bridges susceptible to collecting flash flood debris. Prioritize bridge improvements and/ or replacement. Each	Umatilla County Public Works, Cities	ODOT, USACE, CTUIR, FEMA, DSL, UCEM, County Planning, UCSWCD, Cities	5 years	1, 3,4, 6	Tom and Bob state that Public Works could probably provide this list for Umatilla County. It may be harder to	Retain and modify.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
	jurisdiction would do this for the bridges in within their jurisdiction.					identify private bridges than public ones.	
Long-Term FL #4	Consider areas in Umatilla County and the cities that may be good for flood mitigation through acquisition, removal of existing buildings, and restoration work.	Umatilla County, Pendleton, Milton-Freewater, Hermiston, Athena, Weston, Ukiah, Echo, Stanfield, Umatilla, Adams, Helix, Pilot Rock	DLCD, OEM, FEMA, Silver Jackets,	On-going	1-6	New mitigation action	New mitigation action
Long-Term FL #5	Identify places throughout Umatilla County, in the cities and unincorporated areas, to set up sandbagging stations. Identify equipment and supplies needed.	UCEM	Cities, OEM	5 years	1-6	New mitigation action	New mitigation action
Long-Term FL #6	Conduct flood mitigation/reduction feasibility study for Umatilla River at Riverside.	Pendleton	Umatilla County, OEM, DLCD, USACE, FEMA	5 years	1-6	New mitigation action	New mitigation action
Long-Term FL #7	New levee to protect McKay neighborhood.	Pendleton	Umatilla County, OEM, DLCD, USACE, FEMA	5 years	1-6	New mitigation action	New mitigation action
Long-Term FL #8	Updated floodplain maps.	Pendleton	Umatilla County, OEM, DLCD, USACE, FEMA	5 years	1-6	New mitigation action	New mitigation action
Long-Term FL #9	Basin analysis.	Pendleton	Umatilla County, watershed	5 years	1-6	New mitigation action	New mitigation action

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
			councils, irrigation districts, USACE				
Long-Term FL #10	Alert system/water measuring capabilities on McKay and Umatilla Basin.	Pendleton	Umatilla County, watershed councils, irrigation districts, USACE	5 years	1-6	New mitigation action	New mitigation action
Long-Term FL #11	Certify levee system south of I-84 on the River.	Pendleton	Umatilla County, OEM, DLCD, USACE, FEMA	5 years	1-6	New mitigation action	New mitigation action
Long-Term FL #12	Aquifer Storage and Recovery (ASR): Expansion of water filtration plant and other wells to further slow the decline of groundwater wells.	Pendleton	Umatilla County, watershed councils, irrigation districts, USACE	5 years	1-6	New mitigation action	New mitigation action
Long-Term FL #13	Possibly move Public Works facilities away from levee protection to higher ground at airport.	Pendleton	Umatilla County, watershed councils, irrigation districts, USACE	5 years	1-6	New mitigation action	New mitigation action
Long-Term FL #14	New levee to protect Riverside.	Pendleton	Umatilla County, OEM, DLCD, USACE, FEMA	5 years	1-6	New mitigation action	New mitigation action
Severe Summer Storms and Severe Winter Storms (SS): High Priority							
Long-Term SS #1	Identify opportunities to advance NOAA/NWS warning coverage via wireless and non-wireless infrastructure.	UCEM	NOAA/NWS, OEM, OSP, ODOT, CTUIR, landowners, Cities	5 years	1, 3, 4, 6	Umatilla County has AlertSense. Messages can be sent to people throughout the County, in cities and unincorporated areas.	Retain.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
Long-Term SS #2	Continue to advance the use of communication tools such as AlertSense, WEA, and others to convey hazard and emergency information throughout Umatilla County.	UCEM	NOAA/NWS, OEM, FEMA, OSP, CTUIR, special districts, Cities	5 years	1, 3, 4, 6	Umatilla County still uses the radios but they do not have the distribution program any more. The AlertSense and WEA systems provide communication via text and computer.	Retain.
Long-Term SS #3	The Umatilla County Road Department prioritizes their snow removal efforts for the unincorporated areas within their jurisdiction. They are able to consider making agreements for assistance with other jurisdictions, especially the small Cities in Umatilla County, as needed. The County and the Cities should discuss the Cities' needs, identify if the County can assist, and as applicable begin making agreements to address the needs.	UCEM	Cities, response agencies, special districts, ODOT	5 years	1, 3, 4, 6	Umatilla County has sufficient equipment and personnel to open roads (1700 miles worth, and those are prioritized related to school and work routes) within two days of a winter storm. There is an agreement with ODOT to provide assistance as available. Cities that have sufficient equipment: Pilot Rock, Athena, Hermiston, Umatilla, Weston, Milton-Freewater. Pendleton has little capacity and Echo has none.	Retain and modify.
Long-Term SS #4	Obtain funding and purchase a truck and plow for snow removal. Consider purchasing other snow removal equipment.	City of Echo	UCEM, OEM, cities	5 years	1, 3, 4, 6	New mitigation action	New mitigation action
Long-Term SS #5	Consider adding tasks to an existing committee or creating new committee to	UCEM, Clearview Disability Resource Center	Cities,	5 years	1-4, 6	New mitigation action	New mitigation action

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
	evaluate, identify, and make recommendations for improving access for vulnerable populations in relationship to natural hazards.						
Long-Term SS #6	Snow: Obtain hydraulic blades for sanding trucks for arterial routes.	Pendleton	Umatilla County	5 years	1-6	New mitigation action	New mitigation action
Long-Term SS #7	Obtain funding to purchase snow removal equipment.	Adams	Umatilla County, OEM, Cities	5 years	1, 3, 4, 6	New mitigation action	New mitigation action
Earthquake (EQ): Medium Priority							
Long-Term EQ #1	Identify the resources needed to do a County-wide assessment of buildings/structures in the unincorporated areas and the Cities. The buildings/ structures would be evaluated for vulnerability to seismic activity. With that information, a priority list would be made for retrofits or replacements.	UCEM	OEM, FEMA, Cities, Special Districts	5 years	1, 3, 4, 6	Umatilla County has not done an inventory, nor have the cities. The priority and capacity to do this is limited, but the group supports it.	Retain and modify. Change from Short-Term to Long-Term.
Long-Term EQ #2	Support continuing work to identify all fault patterns in Umatilla County.	UCEM	DOGAMI, USGS, OWRD, CTUIR, County Planning	On-going	1, 3, 4, 6	Bob says 4-5 years ago the USGS looked at fault lines in NE Umatilla County. Funding was an issue and doing fieldwork in a pandemic. Work will re-commence.	Retain.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
Volcano (VO)							
Short-Term VO #1	Identify and establish volcano response protocols (e.g. impacts from seismic activity, ashfall, and debris) that include but are not limited to information about communication, tools, supplies, and vulnerable populations.	UCEM	FEMA, OEM, NOAA/NWS, ODOT, OSP, CTUIR, Cities, response agencies, special districts	1 year On-going	1, 3, 4, 6	No progress has been made since the 2014 Umatilla County NHMP.	Retain and modify.
Landslide/ Debris Flow (LS): Low Priority							
Short-Term #1 LS	Update Goal 7 of the Umatilla County Comprehensive Plan and develop GIS maps designating landslide prone areas or areas where the Steep Slope Overlay Zone applies. Check to see if Cities need assistance with mapping or codes.	Umatilla County Planning	DOGAMI, DLCD, UCEM, landowners, Cities	1 year	1, 3-6	Umatilla County has a steep slope overlay and maps. He will check the date of adoption. Hermiston has steep slope maps. No other cities identified steep slope areas.	Retain and modify.
Long-Term #1 LS	Use the Critical /Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List included in the *2021 Umatilla County NHMP* to identify assets that are potentially impacted from landslides. Map these assets. Identify and implement mitigation measures for these assets.	UCEM	DOGAMI, Public Works, Cities, ODOT, CTUIR, ODF, USFS, special districts, utilities	3-10 years	1, 3-6	No progress.	Retain and modify.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
Drought (DR): Medium Priority							
Short-Term DR #1	Implement 2050 Water Management Plan for Umatilla Basin.	Umatilla County Planning	Cities of Echo, Stanfield, Umatilla, and Hermiston, Task Force, USWS, BOR, USACE, CTUIR, FEMA, NOAA, DSL, OWRD, ODA, OECDD, ODFW, UBWC, landowners, Special Districts	On-going	1-5	Water Management Plan has been adopted. Work is on-going. Some work has been completed while some has yet to be done.	Retain.
Long-Term DR #1	Utilize Columbia River water for replacement of certificated groundwater irrigation rights.	Umatilla County	BOR, CTUIR, State of Oregon, OWRD, landowners, Special Districts	10-20 years	1, 3-5	Work is on-going. Bob says Umatilla County is facilitating this dialogue.	Retain and modify. Changed coordinating organization to "Umatilla County."
Long-Term DR #2	Obtain funds to develop groundwater plans, ensure water supply sustainability, and implement recharge projects.	Umatilla County	CTUIR, USGS, OWRD, landowners, Special Districts, Walla Walla Basin Watershed Council	5-10 years	1-5	Work is on-going.	Retain and modify. Changed coordinating organization to Umatilla County.
Air Quality (AQ) new in 2021 Umatilla County NHMP: High Priority							
Short-Term AQ #1	Collect data of the current uncertified woodstove use in Pendleton.	Pendleton	Air Quality Commission, DEQ	Within 3 years	1-6	New mitigation action.	New mitigation action
Short-Term AQ #2	Perform an air quality study of the contributing factors to air pollution.	Pendleton	Air Quality Commission, DEQ	Within 3 years	1-6	New mitigation action.	New mitigation action

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
Long-Term AQ #1	Review existing fleet vehicle information and converting from gas to alternative fuels.	Pendleton	Air Quality Commission, DEQ	5 years	1-6	New mitigation action	New mitigation action
Long-Term AQ #2	Provide on-site improvement: bikeways, transit infrastructure, and pedestrian enhancements.	Pendleton	Air Quality Commission, DEQ, Umatilla County	5 years	1-6	New mitigation action	New mitigation action
Long-Term AQ #3	Identify energy conservation requirements and what can be done to go beyond those.	Pendleton	Air Quality Commission, DEQ	5 years	1-6	New mitigation action	New mitigation action
Long-Term AQ #4	Research and prepare a wildfire air quality operation plan.	Pendleton	Air Quality Commission, Umatilla County, ODF, USFS, DEQ	5 years	1-6	New mitigation action	New mitigation action
Long-Term AQ #5	Purchase respirators.	Stanfield	Umatilla County, funding sources	5 years	1-6	New mitigation action	New mitigation action
Long-Term AQ #6	Provide on-site improvement: bikeways, transit infrastructure, and pedestrian enhancements.	Umatilla County, Cities of Echo, Umatilla, Hermiston, and Stanfield	Air Quality Commission, DEQ, Pendleton	5 years	1-6	Net mitigation action	New mitigation action
Long-Term AQ #7	Develop the monitoring aspect of the Umatilla County Smoke Management Program. Have Umatilla County purchase and install air quality monitors throughout Umatilla County to enable Umatilla County to better capture	Umatilla County Smoke Management and Planning Department	Pendleton, CTUIR, DEQ, NWS/NOAA	5 years	1-6	New mitigation action	New mitigation action

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Current Status in 2021 NHMP	Retain/ Modify/ Delete
	micro climate data and enable more specific and flexible decision-making based on conditions in a geographic area. Umatilla County will train their staff and the public about the air quality monitors owned by Umatilla County.						

Source: Tricia Sears, DLCD, and the Umatilla County NHMP Steering Committee, 2020-2021

By request of the Umatilla County Emergency Manager, the following information is included here, in the *2021 Umatilla County NHMP,* as an explanation of emergency management for jurisdictions, as excerpted from ORS 401.305 Emergency management agency of city, county or tribal government.

ORS 401.305 - Emergency management agency of city, county or tribal government - 2020 Oregon Revised Statutes (oregonlaws.org)

(1) As used in this section, "tribal government" means a federally recognized sovereign tribal government operating within the borders of this state or an intertribal organization formed by two or more federally recognized sovereign tribal governments operating within this state.

(2) Each county of this state shall, and each city or tribal government may, establish an emergency management agency that is directly responsible to the executive officer or governing body of the county, city or tribe.

(3) The executive officer or governing body of each county, and any city or tribe that participates, shall appoint an emergency program manager who is responsible for the organization, administration and operation of the emergency management agency, subject to the direction and control of the county, city or tribe.

(4) When a city or tribal government has an emergency management agency, the city or tribal government, as applicable, and the counties within which the city or tribal government operates shall jointly establish policies that:

(a) Provide direction and identify and define the purpose and roles of the individual emergency management programs;

(b) Specify the responsibilities of the emergency program managers and staff; and

(c) Establish lines of communication, succession and authority of elected officials for an effective and efficient response to emergency conditions.

(5) Each emergency management agency shall perform emergency program management functions within the territorial limits of the county, city or tribal government and may perform the functions outside the territorial limits as required under any mutual aid or cooperative assistance agreement or as requested and authorized by the county or city in whose territorial limits the emergency functions are performed.

(6) The emergency management functions include, at a minimum:

(a) Coordination of the planning activities necessary to prepare and maintain a current emergency operations plan, management and maintenance of emergency operating facilities from which elected and appointed officials can direct emergency and disaster response activities;

(b) Establishment of an incident command structure for management of a coordinated response by all local emergency service agencies; and

(c) Coordination with the Office of Emergency Management to integrate effective practices in emergency preparedness and response as provided in the National Incident Management System established by the Homeland Security Presidential Directive 5 of February 28, 2003. [1983 c.586 §12; 1993 c.187 §9; 2005 c.825 §11; 2013 c.189 §2]

[1] Legislative Counsel Committee, *CHAPTER 401—Emergency Management and Services*, **https://www.oregonlegislature.gov/bills_laws/ors/ors401.html** (2019) (last accessed May 16, 2020).

[2] Legislative Counsel Committee, *Annotations to the Oregon Revised Statutes, Cumulative Supplement - 2019, Chapter 401*, **https://www.oregonlegislature.gov/bills_laws/ors/ano401.html** (2019) (last accessed May 16, 2020).

[3] OregonLaws.org assembles these lists by analyzing references between Sections. Each listed item refers back to the current Section in its own text. The result reveals relationships in the code that may not have otherwise been apparent. **Currency Information**

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Number of existing mitigation actions from the *2014 Umatilla County NHMP*: 36

Number of existing mitigation actions by hazard: multi-hazard =6, wildfire = 8, flood =6, severe summer storms = 3, severe winter storms = 4, earthquake =2, volcano =1, landslide/debris flows =2, drought =4, and air quality = NA (new in 2020).

Table 3-2 Umatilla County and Cities NHMP Mitigation Actions 2014 Status

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
Multi-Hazard (MH) Actions								
Short-Term MH #1	Complete city addendums to Umatilla County NHMP.	Umatilla County Planning	Incorporated cities of Umatilla County	On-going	1-6	3 out of 12 city plans adopted.	The 2020-21 NHMP has all 12 of the incorporated cities. The city information will be integrated rather than as separate addendums.	Delete. The Steering Committee agreed it was unnecessary to include this as a mitigation action.
Short-Term MH #2	Develop and implement a public awareness campaign regarding natural hazards and natural hazards safety and tools to achieve disaster resistance.	Umatilla County Emergency Management (UCEM)	OPDR, FEMA, OEM, ODOT, County/City EM, NWS, ACOE, Fire Corps, Citizen Groups	On-going	1-5	Actively worked on each year.	UCEM has done outreach, talk to Tom for more info. Darrin from Clearview noted they have done outreach to folks about how to interact with vulnerable populations.	Retain and modify. Add Pacific Power and Umatilla Electric Co-op as partners. Create new mitigation action or bullet point on this one specific to vulnerable population outreach. Need to ascertain best ways to reach vulnerable

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
								populations "take the table to them." Create one bullet point about outreach efforts with utilities.
Short-Term MH #3	Develop Storm Ready Rating Community.	UCEM	NOAA/NWS, response agencies	2 years	2, 4	New mitigation action in 2013.	Umatilla County is a Storm Ready Community. This must be renewed every 3 years; due for renewal in 2021.	Retain and modify. Cities and Tribes can be Storm Ready Rating Communities. Revise language to include them.
Long-Term MH #1	Utilize central location of Umatilla County EOC to create a regional emergency management and information hub for the Pacific Northwest.	UCEM	Counties, Cities, response agencies, private EM crews, FEMA, OEM, ARC, ODOT, ODF, DOGAMI, DSL, USACE, USFS, CTUIR	5-12 years	1-6	No progress.	Many discussions have occurred. However, at this time it is unlikely that OEM will officially designate it specifically as a regional hub.	Retain and modify. Keep focus on the region of NE Oregon.
Long-Term MH #2	Develop a County GIS Department to oversee map generation and upgrades of current and future hazard prone areas.	Umatilla County Planning	UCEM, CTUIR, DOGAMI, ODOT, City EM, utilities and transmission companies, FEMA, OEM	On-going	1, 3-6	Formed a GIS Department.	Accomplished. Planning Dept. has a planner with GIS skills. There is a GIS coordinator in Records.	Retain and modify. Cities like Umatilla have GIS capability in house but cities like Echo do not. Emphasize

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
								that County is a hub for data and assistance.
Long-Term MH #3	Develop an inventory/ database of utility facilities located in the County.	Umatilla County Planning	UCEM, CTUIR, DOGAMI, ODOT, City EM, utilities and transmission companies, special districts, FEMA, OEM	On-going 2 years	1, 3-6	New action in 2013	Accomplished. There is a robust map of utility lines and hubs.	Delete.
Wildfire (WF) Actions								
Short-Term WF #1	Work with agriculture and conservation groups to establish fire buffers between both forest and range wildland urban interface areas.	Fire Defense Board	OEM, NRCS, ODA, USDA, SWCD, County/City EM, agricultural community, UCEM	3-5 years	1-5	No progress	In process. Discussion noted the Governor's Wildfire Council's recommendations. Also that ODF works with County and Fire Defense Board on this.	Retain. Add partner organizations.
Short-Term WF #2	Seek funding for a full time County position to further fire prevention planning and education.	UCEM	ODF, USFS, CTUIR, response agencies, private fire companies	1-2 years	1-5	No progress	Tom is working on getting funding for two positions at UCEM. One position would have responsibility for fire prevention	Retain and modify.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
							planning and education.	
Long-Term WF #1	Work with citizens of Umatilla County to ensure that all areas are protected under a rural fire district.	UCEM	ODF, County/City EM, CTUIR, BLM, USFS, BOC	1-2 years	1-2, 4-6	No progress	In process.	Retain and modify. ODF staff notes much of Umatilla County is not in a rural fire district. Working to add areas to fire districts.
Long-Term WF#2	Identify substandard interface access roads and provide incentive funding to bring roads up to current fire and life safety standards. Begin with inventory of critical roads.	Fire Defense Board	ODOT, County Public Works, County Planning, CTUIR, OEM, UCEM, ODF, USFS	5-10 years	1-4,-6	No progress	Bob says County Public Works has a list of roads and bridges; they will work to inventory and prioritize them.	Retain and modify. Move to Long-Term MH as #4. Renumber the Long-Term WF mitigation actions. Access roads are key for many hazards, not just wildfire. Change Coordinating organization to Umatilla County
Long-Term WF #3	Provide logistics and grant writing support to Meacham Volunteer Fire Department to build a fire station that allows all	Meacham Rural Fire Department	UCEM	5-10 years	1,4,6	No progress	Meacham does not have a fire station.	Remove. Tom and Bob state that it is not a viable option at this time.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
	equipment to be stored at a central location.							
Long-Term WF #4	Complete feasibility studies of biomass potential on forest lands. Create incentive funding to test biomass technology in Umatilla County.	Umatilla County Economic Development	ODF, USFS, OECDD, State of Oregon, OEM, FEMA	5-10 years	No goals are marked	No progress	No progress on the biomass feasibility study. ODF noted they have a Cohesive Wildfire Strategy Coordinator position; it is cooperatively funded in NE Oregon.	Retain. There are three CWPPs in Umatilla County: Blue Mountain Foothills Region CWPP, West County CWPP, and the Mill Creek OR & Walla Walla WA CWPP These need to be updated.
Long-Term WF #5	Support removal/ reduction of biomass fire hazards on private and public lands.	ODF	UCEM, USFS, State of Oregon	On-going	1-2, 4-6	New mitigation action in 2013	Matt and Tom note ODF fuels reduction has been done. Funding from ODF can be obtained for that work. NRCS also has potential funding sources.	Retain. Governor's Wildfire Council recommendations from November 2019 provides info.https://www.oregon.gov/gov/policy/Pages/wildfirecouncil.aspx
Long-Term WF #6	Develop upland storage ponds for wildlife benefit and to be used during wildland fire suppression efforts.	ODFW, ODF	UCEM, OWRD, DSL, CTUIR, landowners, districts, WWBWC	On-going	1-2, 4-6	No progress	On-going	Retain

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
Flood (FL)								
Short-Term FL #1	Develop conservation easements and riparian plantings within mapped and unmapped floodplain areas and farmland with highly erodible soils.	Watershed councils such as the Walla Walla River Basin Watershed Council	SWCD, NRCS, ODA, USDA, CTUIR, Wheat League, Blue Mountain Land Trust, Riverside – Mission Water Control District, Milton-Freewater Water Control District, Walla Walla River Irrigation District, Stanfield Irrigation District, Hermiston Irrigation District, Westland Irrigation District, Teel Irrigation District, West Extension Irrigation District, Gardena Farms Irrigation District, Hudson Bay District Improvement Co, FEMA	1-5 years	1-5	No progress	Work is on-going. Work has been done and will continue with watershed councils and UCSWCD. Bank stabilization and restoration or priority actions. Post 2019 flood recovery group has been working on that. UCSWCD is leading that. The post 2020 flood recovery group that will work on this too.	Retain and modify.
Short-Term FL #2	Identify areas able to absorb high-velocity streamflows w/o impacting investments	NRCS, SWCD, WWBWC	UBWC, CTUIR, ODFW, USFWS, BOR, USACE,	1-5 years	1-5	No progress	Watershed councils and irrigation districts have	Retain.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
	(i.eg. re-establish or create artificial floodplains). Establish connectivity and diversion infrastructure to be utilized during high water events to divert high water to these areas.		special districts, landowners				worked to remove two dams -Brownell Dam and Dillon Dam- on the Umatilla River.	
Short-Term FL #3	Develop and maintain the database of all landowners within the FEMA Special Flood Hazard Areas in the County. Use database to distribute outreach and emergency notices related to flooding.	Umatilla County Planning	County, FEMA, OEM, Cities	On-going	2-4	Database generated by Planning. Outreach on-going from Planning and from UCEM.	There is an inventory of properties in the floodplain. They have not done a mailer to each property. They do outreach about floods and flood insurance. They use AlertSense and have the capability to access iPaws and WEA through it. These capability's combined give either subscription based notifications and/or for targeting as well as County wide. They have cross	Retain and modify. Having a collaboration using the skills and tools of both the Planning and Emergency Management Departments provides excellent information and tools to people in unincorporated areas and incorporated cities.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
							county capacity within AlertSense with Morrow County (discussing possible future cross co with Grant and Union) so they can activate one another's systems if necessary.	
Long-Term FL #1	Identify and map canyons and draws, roads susceptible to high-water and flash flood event but not located on FEMA FIRM maps.	Umatilla County Planning	UCEM, GIS, FEMA, DSL, USACE, CTUIR, OEM, response agencies, NOAA	5 years	1-4	No progress	Tom and Bob have noted several areas prone to floods that are not identified on flood maps.	Retain and modify. Planning, Emergency Management, and Public Works need to collaborate on this one.
Long-Term FL #2	Obtain funding to upgrade existing levees and berms to USACE standards in order to ensure continuing flood protection, including Umatilla River Levee through Pendleton and Walla Walla River Levee through Milton-Freewater.	City of Pendleton, City of Milton-Freewater	FEMA, OEM, USACE, DSL, CTUIR, ODFW, special districts, Umatilla County	1-2 years	1-4	Funding was obtained, levee work begun.	No work occurred in Umatilla County. Milton-Freewater recertified their levee.	Retain and modify.
Long-Term FL #3	Identify public and private bridges susceptible to collecting flash flood	Umatilla County Public Works	ODOT, USACE, CTUIR, FEMA, DSL,	5 years	1, 3,4, 6	No progress	Tom and Bob state that Public Works	Retain and modify.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
	debris. Prioritize bridge improvements and/ or replacement. Each jurisdiction would do this for the bridges in within their jurisdiction.		UCEM, County Planning				could probably provide this list for Umatilla County. It may be harder to identify private bridges than public ones.	
Severe Summer Storms (SS)								
Short-Term SSS #1	Complete necessary tasks to obtain a NOAA NWS Storm Ready rating. Note: This is the same mitigation action as Short-Term MH #3. Combine them.	UCEM	NOAA/NWS, Dispatch	1-2 years	1, 3, 4, 6	No progress	Umatilla County is a Storm Ready Community. This must be renewed every 3 years; due for renewal in 2021.	Retain and modify. Cities and Tribes can be Storm Ready Rating Communities. Revise language to include them.
Long-Term SSS #1	Identify opportunities to advance NOAA/NWS warning coverage via wireless and non-wireless infrastructure.	UCEM	NOAA/NWS, OEM, OSP, ODOT, CTUIR, landowners	5 years	1, 3, 4, 6	No progress	Umatilla County has AlertSense. Messages can be sent to people throughout the County, in cities and unincorporated areas.	Retain.
Long-Term SSS #2	Implement a NOAA Weather Radio (previously Tone Alert Radio) program to provide radios to all schools,	UCEM	NOAA/NWS, OEM, FEMA, OSP, CTUIR, special districts	5 years	1, 3, 4, 6	No progress	Umatilla County still uses the radios but they do not have the	Retain.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
	communication stations and other interested private and public entities to increase advanced warning capabilities of NOAA/ NWS and UCEM.						distribution program any more. The AlertSense and WEA systems provide communication via text and computer.	
Severe Winter Storms (SWS)								
Short-Term SWS #1	Complete necessary tasks to obtain a NOAA/ NWS Storm Ready rating.	UCEM	NOAA/ NWS, Dispatch	1-2 years	1, 3, 4, 6	No progress	This is a repeat of Short Term SSS#1 above.	Combine with SSS.
Long-Term SWS #1	Identify opportunities to advance NOAA/ NWS warning coverage via wireless and non-wireless infrastructure.	UCEM	NOAA/NWS, OEM, OSP, ODTO, CTUIR, landowners	5 years	1, 3, 4, 6	Some progress by NOAA/NWS	This is a repeat of SSS Long-Term #1 above.	Combine with SSS.
Long-Term SWS #2	Implement a NOAA Weather Radio (previously Tone Alert Radio) program to provide radios to all schools, communication stations and other interested private and public entities to increase advanced warning capabilities of NOAA/ NWS and UCEM.	UCEM	NOAA/NWS, OEM, FEMA	5 years	1, 3, 4, 6	No progress	This is a repeat of SSS Long-Term #2 above.	Combine with SSS.
Long-Term SWS #3	Determine snow removal capabilities of Umatilla County. Provide funding for snow removal	UCEM	Cities, response agencies, special districts,	5 years	1, 3, 4, 6	No progress	Umatilla County has sufficient equipment and	Retain and modify.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
	equipment in areas with minimal or no snow removal capabilities.						personnel to open roads (1700 miles worth, and those are prioritized related to school and work routes) within two days of a winter storm. There is an agreement with ODOT to provide assistance as available. Cities that have sufficient equipment: Pilot Rock, Athena, Hermiston, Umatilla, Weston, Milton-Freewater. Pendleton has little capacity and Echo has none.	
Earthquake (EQ)								
Short-Term EQ #1	Complete county-wide assessment of structures vulnerable to earthquake damage. Obtain funding	UCEM	OEM, FEMA, Cities, special districts	On-going	1, 3, 4, 6	Assessment complete. No retrofitting has occurred.	Umatilla County has not done an inventory, nor	Retain and modify. Change to be Long-Term.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
	to retrofit high priority structures.						have the cities. The priority and capacity to do this is limited, but the group supports it.	
Long-Term EQ #1	Support continuing work to identify all fault patterns in Umatilla County.	UCEM	DOGAMI, USGS, OWRD, CTUIR, County Planning	On-going	1, 3, 4, 6	No progress.	Bob says 4-5 years ago the USGS looked at fault lines in NE Umatilla County. Funding was an issue and doing fieldwork in a pandemic. Work will re-commence.	Retain.
Volcano (VO)								
Short-Term VO #1	Create volcano response protocols for protection from seismic activity and debris damage.	UCEM	FEMA, OEM, NOAA/NWS, ODOT, OSP, CTUIR, Cities, response agencies, special districts	1 year On-going	1, 3, 4, 6	No progress	No progress has been made since the 2014 Umatilla County NHMP.	Retain and modify.
Landslide/ Debris Flow (LD)								
Short-Term #1 LD	Update Goal 7 of the Umatilla County Comprehensive Plan and develop GIS maps designating landslide prone areas or areas	Umatilla County Planning	DOGAMI, UCEM, landowners	1 year	1, 3-6	No progress	Umatilla County has a steep slope overlay and maps. He will check the date of adoption.	Retain and modify.

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
	where the Steep Slope Overlay Zone applies.						Hermiston has steep slope maps. No other cities identified steep slope areas.	
Long-Term #1 LD	Identify and implement mitigation measures where important infrastructure for evacuation, emergency vehicle access, commodity transport, information dissemination and utilities may be prone to damage from site specific landslides.	UCEM	DOGAMI, Public Works, Cities, ODOT, CTUIR, ODF, USFS, special districts, utilities	3-10 years	1, 3-6	No progress	No progress.	Retain and modify.
Drought (DR)								
Short-Term DR #1	Implement 2050 Water Management Plan for Umatilla Basin.	Umatilla County Planning	Task Force, USWS, BOR, USACE, CTUIR, FEMA, NOAA, DSL, OWRD, ODA, OECDD, ODFW, UBWC, landowners, special districts	On-going	1-5	Water Management Plan has been adopted	Work is on-going. Some work has been completed while some has yet to be done.	Retain.
Long-Term DR #1	Utilize Columbia River water for replacement of certificated groundwater irrigation rights.	Umatilla Basin Water Commission	BOR, CTUIR, State of Oregon, OWRD, landowners, special districts	10-20 years	1, 3-5	A pilot project has developed.	Work is on-going. Bob says Umatilla County is facilitating this dialogue. List them as	Retain and modify. Changed coordinating organization to

Mitigation Action	Description	Coordinating Organization	Partner Organizations	Timeline	NHMP Goals	Status as of 2013 noted in 2014 NHMP	Current Status in 2021 NHMP	Retain/ Modify/ Delete
							Coordinating Organization.	Umatilla County.
Long-Term DR #2	Obtain funds to develop groundwater plans, ensure water supply sustainability, and implement recharge projects.	Umatilla Basin Water Commission	CTUIR, USGS, OWRD, landowners, special districts	5-10 years	1-5	State funds have been secured.	Work is on-going. List another organization as the Coordinating Organization?	Retain and modify. Changed coordinating organization to Umatilla County.
Long-Term DR #3	Complete settlement of CTUIR water claims and maximize benefit of Phase III infrastructure.	Umatilla Basin Water Commission	CTUIR, BIA, BOR, landowners, special districts	5-15 years	1-5	Federal negotiations have begun.	Most of the negotiations have been done. Once they are ready, they have to get it approved through Congress.	Delete. Do not include this mitigation action in the 2021 Umatilla County NHMP.

Source: Tricia Sears, DLCD, and Umatilla County Steering Committee, 2020-2021

Section 4: Plan Implementation and Maintenance

The Plan Implementation and Maintenance section details the formal process that will ensure that the *2021 Umatilla County Natural Hazards Mitigation Plan* (NHMP) remains an active and relevant document. The plan implementation and maintenance process includes a schedule for monitoring and evaluating the plan semi-annually, as well as updating the plan every five years. This section describes how Umatilla County, the Cities, and the Special Districts will integrate public participation throughout the plan maintenance and implementation process.

Implementing the Plan

The success of the *2021 Umatilla County NHMP* depends on how well the mitigation actions In Table 3-1 are implemented. To ensure that the mitigation actions are implemented, the following steps are taken: the NHMP will be formally adopted; a coordinating body is assigned; a convener is designated; the mitigation actions are evaluated and prioritized; and the NHMP will be implemented through existing plans, programs, and policies.

Plan Adoption

Once the Umatilla County NHMP is locally reviewed and ready, the Umatilla County NHMP Convener (the Planning Director and the Emergency Manager) and the DLCD Natural Hazards Planner submit it to the State Hazard Mitigation Officer (SHMO) at Oregon's Office of Emergency Management (OEM). OEM reviews the NHMP. Once OEM reviews the NHMP and deems it ready; they submit it to the Federal Emergency Management Agency (FEMA) Region X for review. This review addresses the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201.6.

Upon pre-approval by FEMA, indicated by a letter provided from FEMA to Umatilla County called the "Approved Pending Adoption" (APA), the County will then adopt the NHMP via resolution. Following County adoption, the other participating plan holder jurisdictions – the twelve incorporated Cities and the four Special Districts that signed IGAs- will need to adopt the NHMP. The Umatilla County NHMP Convener and the DLCD Natural Hazards Planner will then provide both OEM and FEMA with the approved resolutions from the participating plan holder jurisdictions.

Once FEMA is provided with final resolution documentation from all plan holder jurisdictions, they will formally approve the *2021 Umatilla County NHMP*. At that point Umatilla County will maintain their eligibility for the Hazard Mitigation Assistance (HMA) pre- and post- disaster funds. These funds are distributed through the Building Resilient Infrastructure and Communities (BRIC) program, the Hazard Mitigation Grant Program (HMGP), and the Flood Mitigation Assistance (FMA) program.

The accomplishment of the *2021 Umatilla County NHMP* goals and mitigation actions depends upon regular NHMP Steering Committee participation and support from County, Cities, and Special Districts leadership. Thorough familiarity with this NHMP will result in the efficient and effective implementation of mitigation actions, and the integration of the NHMP into plans, policies, and programs. This will result in a reduction in the risk and the potential for loss from future natural hazard events.

Copies of the resolutions of approval from Umatilla County, the Cities, and the Special Districts will be included in the Umatilla County NHMP once they are received. Copies of the FEMA APA and final approval letters will also be included in the Umatilla County NHMP when they are received. The DLCD Natural Hazards Planner will provide the final copy of the *2021 Umatilla County NHMP* in Word and PDF.

Convener and Coordinating Body

The Umatilla County Planning Director and the Umatilla County Emergency Manager, or their designated delegates, will take responsibility for plan implementation. The Umatilla County Planning Director and the Umatilla County Emergency Manager, or their designated delegates, are the Conveners of the NHMP Steering Committee and the maintenance meetings. The Conveners will facilitate the meetings and will assign tasks such as updating and presenting the plan to the rest of the members of the committee. NHMP implementation and evaluation will be a shared responsibility among the NHMP Steering Committee members. The Convener's responsibilities include:

- Coordinate coordinating body meeting dates, times, locations, agendas, and member notification;
- Documenting the discussions and outcomes of committee meetings;
- Serving as a communication conduit between the coordinating body and the public/stakeholders;
- Identifying emergency management-related funding sources for natural hazard mitigation projects; and
- Utilizing the Risk Assessment as a tool for prioritizing proposed natural hazard risk reduction projects.

Members

The NHMP update was developed by the Umatilla County NHMP Steering Committee which includes Umatilla County, the twelve incorporated Cities, the Special Districts, and others. A roster of the NHMP Steering Committee is included in the Acknowledgements section of this NHMP. It is anticipated the Umatilla County NHMP Steering Committee will continue so as to provide the implementation and evaluation of the progress of the NHMP. This will help ensure that the NHMP is a living document that is used and stays connected to the plans, policies, and programs of the involved jurisdictions and other NHMP Steering Committee members. The NHMP Steering Committee work may continue with the Umatilla County Emergency Action Committee. Of note, the Emergency Management Performance Grant (EMPG) grant requires review of the NHMP twice per year.

To make the coordination and review of the Umatilla County NHMP as broad and useful as possible, the Umatilla County Planning Director and the Umatilla County Emergency Manager, or their designated delegates, will engage the stakeholders to implement the mitigation actions. Specific organizations have been identified as leads/coordinating agencies and as partners for the mitigation actions listed for the *2021 Umatilla County NHMP*; these are identified in Table 3-1.

Implementation through Existing Programs

The NHMP includes mitigation actions that, when implemented, will mitigate hazard events throughout Umatilla County. Within the NHMP, FEMA requires the identification of existing plans, programs, and policies that might be used to implement these mitigation actions.

Umatilla County and the Cities currently address Oregon's Statewide Planning Goals and legislative requirements through their comprehensive land use plans, capital improvement plans, mandated standards, and building codes. Umatilla County, the Cities, and the Special Districts will incorporate the mitigation actions from this NHMP into existing programs, procedures, plans, and policies. Plans, programs, procedures, and policies already in existence often have support from local residents, businesses, and policy-makers. Many land use, comprehensive, and strategic plans are updated regularly, and can adapt easily to changing conditions and needs. Implementing the mitigation actions from the NHMP through such plans and policies increases their likelihood of being supported and implemented.

Examples of plans, programs or agencies that may be used to implement mitigation actions:

- City and County Budgets,
- Community Wildfire Protection Plans,
- Comprehensive Land Use Plans,
- Economic Development Action Plans,
- Zoning Ordinances & Building Codes, and
- Emergency Operations Plans and Continuity of Operations Plans (COOP).

The specific plans that presently exist related to this NHMP and the FEMA requirement are listed in Table 4-1; these are the same plans listed in Table B-20 in Appendix B Community Profile. For additional examples of plans, programs, policies, procedures and agencies that may be used to implement mitigation actions, refer to the sections entitled "Government Structure" and "Existing Plans & Policies" in Appendix B Community Profile, and the *2021 Umatilla County NHMP* mitigation actions in Table 3-1.

Table 4-1 Existing Plans for Umatilla County, Participating Cities, and Special Districts (Same as Table B-20)

Jurisdiction	Document	Year
Umatilla County	Code of Ordinances (includes Development Code, Emergency Operations, Smoke Management, Solid Waste etc.)	On-going
Umatilla County	Comprehensive Plan	1983, Amended
Umatilla County	Development Code	1983, Amended
Umatilla County	Transportation System Plan	2002
Umatilla County	Natural Hazards Mitigation Plan	2021 in process, 2014 existing, expired
Umatilla County	Emergency Operations Plan	2012 (Ord. 1991-07, passed December 18, 1991; Ord. 2003-16, passed December 17,

Jurisdiction	Document	Year
		2003; Ord. 2005-16, passed October 5, 2005; Ord. 2009-08, passed October 21, 2009; Ord. 2012-01, passed January 18,2012)
Umatilla County	Community Wildfire Protection Plans: the *West County CWPP* (2006), the *Blue Mountains and Foothills Region CWPP* (2005), and the *Mill Creek and Walla Walla County CWPP* (2017)	2005, 2006, and 2017
Umatilla County	Umatilla County Strategic Plan	2019 updated 2014 original
Umatilla County	Smoke Management Operating Plan	2013
Stanfield Irrigation District	Water Management and Conservation Plan	2010
Hermiston Irrigation District	Umatilla Basin Annual Operating Plan	2016
Hermiston Irrigation District	Umatilla Project Emergency Management Plan	2016
Hermiston Irrigation District	Water Management and Conservation Plan	2018
Umatilla County Soil and Water Conservation District	Annual Plan	Every year
Umatilla County Soil and Water Conservation District	5 Year Business Plan	2020-2025 current
Walla Walla River Irrigation District	Walla Walla River Irrigation District's (WWRID) authority is granted by Oregon Revised Statute (ORS). ORS Chapter 545 provides WWRID the framework to implement hazard mitigation projects that are supportive of the district's responsibility to deliver irrigation water to its customers. Although WWRID does not have a local strategic plan, the district does have a set of adopted bylaws that guide the formation and work of the district manager and board of directors.	current
City of Adams	Comprehensive Plan	2013
City of Adams	Development Code	2015
City of Adams	Transportation System Plan	2003

Jurisdiction	Document	Year
City of Athena	Comprehensive Plan	1978, Amended
City of Athena	Development Code	2013
City of Athena	Transportation System Plan	1999
City of Echo	Comprehensive Plan	2005
City of Echo	Development Code	2010
City of Echo	Transportation System Plan	2001
City of Helix	Comprehensive Plan	2001
City of Helix	Development Code	2001
City of Helix	Transportation System Plan	2001
City of Hermiston	Comprehensive Plan	1992, Amended
City of Hermiston	Development Code	1994, Amended
City of Hermiston	Transportation System Plan	1997, Amended
City of Milton-Freewater	Comprehensive Plan	1978, Amended
City of Milton-Freewater	Development Code	1978, Amended
City of Milton-Freewater	Transportation System Plan	1999, Amended
City of Milton-Freewater	Parks and Recreation Master Plan	2020
City of Pendleton	Comprehensive Plan	1983
City of Pendleton	Development Code	2014, Amended
City of Pendleton	Transportation System Plan	2016
City of Pilot Rock	Comprehensive Plan	2001, Amended
City of Pilot Rock	Development Code	2005
City of Pilot Rock	Transportation System Plan	2001
City of Stanfield	Comprehensive Plan	2003, Amended
City of Stanfield	Development Code	2001, Amended
City of Stanfield	Transportation System Plan	2001, Amended
City of Ukiah	Comprehensive Plan	2013
City of Ukiah	Development Code	2011
City of Ukiah	Transportation System Plan	2001
City of Umatilla	Comprehensive Plan	2013, Amended

Jurisdiction	Document	Year
City of Umatilla	Development Code	1999, Amended
City of Umatilla	Transportation System Plan	2001, Amended
City of Weston	Comprehensive Plan	2001, Amended
City of Weston	Development Code	2001
City of Weston	Transportation System Plan	2001
All	ORS 401.305 - Emergency management agency of city, county or tribal government - 2020 Oregon Revised Statutes (oregonlaws.org)	2020

Source: Bob Waldher, Umatilla County; Tiffany Harrell, Stanfield Irrigation District, personal communication 2/23/21; Umatilla County Emergency Operations Plan, http://www.co.umatilla.or.us/bcc/codes/35.pdf; Umatilla County Strategic Plan, http://www.co.umatilla.or.us/bcc/agendas/Item081204.pdf; Umatilla County Wildfire Protection Plans listed on the website and confirmed by Tom Roberts, Gina Miller, Umatilla County, personal communication, 2/23/21; Umatilla County, personal communication; Kyle Waggoner, Umatilla County Soil and Water Conservation District, personal communication 2/23/21; City of Adams Website, http://www.cityofadamsoregon.com/ordinances.html; City of Athena Website, https://www.cityofathena.com/ordinances/; City of Hermiston Website, https://www.hermiston.or.us/commdev/page/planning-department; City of Ukiah Website, http://www.cityofukiahoregon.com/departments.html#landuseplanning; City of Umatilla Website, https://www.umatilla-city.org/planning; David Slaght, City of Echo, personal communication 3/4/21; Clinton Spencer, City of Hermiston, personal communication 3/4/21; Teri Bacus, City of Pilot Rock, personal communication 3/4/21; Donna Grimes, City of Adams, personal communication 3/5/21; George Cress, City of Pendleton, personal communication 3/5/21; Brandon Seitz, City of Umatilla, personal communication 3/9/21; Benjamin Burgener, City of Stanfield, personal communication 3/9/21;

Plan Maintenance

Plan Maintenance

Plan maintenance is a critical component of the NHMP. Proper maintenance of the plan ensures that this plan will maximize Umatilla County, the Cities, and the Special District's efforts to reduce the risks posed by natural hazards. The Conveners, the coordinating body, and local staff are responsible for implementing, maintaining, and updating the NHMP in meetings described below.

Meetings

The coordinating body is composed of members of the NHMP Steering Committee. This may be as the Umatilla County Emergency Action Committee and/or in collaboration with the Umatilla County Emergency Action Committee. The coordinating body will meet at least twice per year to complete the following tasks.

During the first meeting, the NHMP Steering Committee will:

- Review existing mitigation action items to determine appropriateness for funding;
- Educate and train new members on the plan and mitigation in general;
- Identify issues that may not have been identified when the plan was developed; and
- Prioritize potential mitigation projects using the methodology described below.

During the second meeting the NHMP Steering Committee will:

- Review status and progress of the mitigation actions;
- Document the status of the mitigation actions;
- Review existing and new risk assessment data;
- Discuss already held and upcoming continued public involvement events; and
- Document successes and lessons learned during the year.

These meetings are an opportunity for each jurisdiction and organization to report back to the Conveners and the NHMP Steering Committee on progress that has been made towards the mitigation actions and other parts of the NHMP.

The Conveners are the Umatilla County Planning Director and the Umatilla County Emergency Manager, or their designated delegates, and he/she will be responsible for documenting the outcome of the semi-annual meetings. The process the coordinating body will use to prioritize mitigation projects is described in Section 3 Mitigation Strategy and briefly below in the "Project Prioritization Process" section.

The NHMP format allows Umatilla County and participating jurisdictions and organizations to review and update sections when new data becomes available. New data can be easily incorporated, and discussed with the NHMP Steering Committee, resulting in a NHMP that remains current and relevant to the participating jurisdictions and organizations. The at least twice a year meetings of the NHMP Steering Committee provide an excellent forum for discussions such as those on the status of mitigation actions, new data, and opportunities for funding.

Project Prioritization Process

The Disaster Mitigation Act of 2000 requires that jurisdictions identify a process for prioritizing mitigation actions. Mitigation actions come from a variety of sources such as NHMP Steering Committee members, local government staff, other planning documents, or the risk assessment. Therefore, the project prioritization process needs to be flexible and shaped to the community's needs.

In brief, the selected prioritization format used in the *2021 Umatilla County NHMP* is the risk level rankings from the Hazard Vulnerability Assessment. Of the nine natural hazards, five were identified as high risk level, three at the medium risk level, and one as low risk level. The high risk level means the mitigation actions are high priority, similarly for medium and low risk level and priority. There are hazard-specific mitigation actions and multi-hazard mitigation actions.

All the multi-hazard mitigation actions are a high priority. The hazard-specific mitigation actions that are a high priority are the floods, air quality, severe summer storms, severe winter storms, and wildfire mitigation actions. The medium hazards are drought, earthquakes, and volcanoes. Landslides are low priority mitigation actions. See Table 3-1, 2021 Umatilla County NHMP Mitigation Actions.

Resource availability, including such factors as staff time and funding, are part of the categorization of whether the action is short- or long-term.

- *Short-term actions* are activities that may be implement with existing resources and authorities in one to two years.
- *Long-term actions* are those that may require new or additional resources and/or authorities.
- *Ongoing activities* are those that are currently in process and will continue to be implemented during the next planning period.

The project prioritization process that was written by the Oregon Partnership for Disaster Resilience (OPDR) and included in the *2014 Umatilla County NHMP* has been removed because is not the process that Umatilla County used to establish priorities for the mitigation action in this *2021 Umatilla County NHMP*. In Appendix D Economic Analysis of Natural Hazard Mitigation Projects, there is a detailed description of the three potential approaches of economic analysis to prioritize the mitigation actions: benefit/cost analysis, cost-effectiveness analysis, and the STAPLE/E approach. Appendix D includes a diagram, Economic Analysis Flowchart, to illustrate the process.

Continued Public Involvement & Participation

The participating jurisdictions are dedicated to involving the public directly in the continual reshaping and updating of the Umatilla County NHMP. In addition to the members of the coordinating body, also known as the NHMP Steering Committee, the public will also have the opportunity to continue to provide feedback about the NHMP.

To ensure that these opportunities will continue, the County and participating jurisdictions will:

- Post copies of the *2021 Umatilla County NHMP* on the County, Cities, and Special Districts websites;
- Place articles in the local newspaper directing the public where to view and provide feedback; and
- Use existing newsletters such as schools and utility bills to inform the public where to view and provide feedback.
- Use social media tools and AlertSense as applicable.

The *2021 Umatilla County NHMP* will be on the Umatilla County website at: Umatilla County NHMP.

The NHMP may also be archived and posted on the University of Oregon Libraries' Scholar's Bank Digital Archive at https://scholarsbank.uoregon.edu and on the Oregon Department of Land Conservation and Development's website at https://www.oregon.gov/lcd/Pages/index.aspx.

Five-Year Review of Plan

This plan will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. **With FEMA approval granted in 2021, the Umatilla County NHMP would be due to be updated in 2026.** The Conveners, the Umatilla County Planning Director and the Umatilla County Emergency Manager, or their designated delegates, will be responsible for organizing the coordinating body, which is the NHMP Steering Committee and or the Umatilla County Emergency Action Committee, to address plan update needs. Table 4-2 is a toolkit that can assist determining which NHMP actions might be discussed during plan maintenance meetings, and which might require additional meeting time and/or the formation of sub-committees.

Table 4-2 Natural Hazards Mitigation Plan Update Toolkit

Question	Yes	No	Plan Update Action
Is the planning process description still relevant?			Modify this section to include a description of the plan update process. Document how the planning team reviewed and analyzed each section of the plan, and whether each section was revised as part of the update process. (This toolkit will help you do that).
Do you have a public involvement strategy for the plan update process?			Decide how the public will be involved in the plan update process. Allow the public an opportunity to comment on the plan process and prior to plan approval.
Have public involvement activities taken place since the plan was adopted?			Document activities in the "planning process" section of the plan update
Are there new hazards that should be addressed?			Add new hazards to the risk assessment section
Have there been hazard events in the community since the plan was adopted?			Document hazard history in the risk assessment section
Have new studies or previous events identified changes in any hazard's location or extent?			Document changes in location and extent in the risk assessment section
Has vulnerability to any hazard changed?			Document changes in vulnerability in the risk assessment section
Have development patterns changed? Is there more development in hazard prone areas?			Document changes in vulnerability in the risk assessment section
Do future annexations include hazard prone areas?			Document changes in vulnerability in the risk assessment section
Are there new high risk populations?			Document changes in vulnerability in the risk assessment section
Are there completed mitigation actions that have decreased overall vulnerability?			Document changes in vulnerability in the risk assessment section
Did the plan document and/or address National Flood Insurance Program repetitive flood loss properties?			Document any changes to flood loss property status
Did the plan identify the number and type of existing and future buildings, infrastructure, and critical facilities in hazards areas?			1) Update existing data in risk assessment section, or 2) determine whether adequate data exists. If so, add information to plan. If not, describe why this could not be done at the time of the plan update
Did the plan identify data limitations?			If yes, the plan update must address them: either state how deficiencies were overcome or why they couldn't be addressed
Did the plan identify potential dollar losses for vulnerable structures?			1) Update existing data in risk assessment section, or 2) determine whether adequate data exists. If so, add information to plan. If not, describe why this could not be done at the time of the plan update
Are the plan goals still relevant?			Document any updates in the plan goal section
What is the status of each mitigation action?			Document whether each action is completed or pending. For those that remain pending explain why. For completed actions, provide a 'success' story.
Are there new actions that should be added?			Add new actions to the plan. Make sure that the mitigation plan includes actions that reduce the effects of hazards on both new and existing buildings.
Is there an action dealing with continued compliance with the National Flood Insurance Program?			If not, add this action to meet minimum NFIP planning requirements
Are changes to the action item prioritization, implementation, and/or administration processes needed?			Document these changes in the plan implementation and maintenance section
Do you need to make any changes to the plan maintenance schedule?			Document these changes in the plan implementation and maintenance section
Is mitigation being implemented through existing planning mechanisms (such as comprehensive plans, or capital improvement plans)?			If the community has not made progress on process of implementing mitigation into existing mechanisms, further refine the process and document in the plan.

Source: Oregon Partnership for Disaster Resilience (2010).

Volume II: Hazard Annexes

Aerial Image of Flooding on Walla Walla River, February 2020, Credit: John Shafer

Emigrant Fire Near Interstate-84 Outside Pendleton, July 2016, Credit: Umatilla County

Source: Robert Waldher, Planning Director, Umatilla County, personal communication, 1/8/21

Introduction

Umatilla County identifies nine natural hazards that could impact the County, the twelve incorporated cities and the four special districts, as described in Section 2 Risk Assessment and within these Hazard Annexes. Table HA-1 below is the same as Table 2-4 in the Risk Assessment; it summarizes the hazards and their risk scores and risk level. Each hazard has a Hazard Annex.

The natural hazard identification and risk levels were assessed and ascertained by the NHMP Steering Committee; they play into the establishment and prioritization of mitigation actions. It is useful to keep in mind that knowing your hazards is the key to reducing the risk. Without knowing them, the ability to reduce risk is lessoned and appropriate mitigation actions are difficult to establish. Mitigation actions for this *2021 Umatilla County NHMP* are for Umatilla County, the twelve cities, and the four special districts; these are in Section 3 Mitigation Strategy, Table 3.1. For a status update of the *2014 Umatilla County NHMP* mitigation actions, see Table 3.2.

Table HA-1 Natural Hazards, Risk Scores, and Risk Levels for Umatilla County

HAZARD	RISK SCORE	RISK LEVEL (H-M-L)
Floods	240	High
Air Quality	224	High
Severe Summer Storm	223	High
Severe Winter Storm	220	High
Wildfire	203	High
Drought	184	Medium
Earthquakes	151	Medium
Volcano	127	Medium
Landslides/Debris Flows	85	Low

Source: Umatilla County NHMP Steering Committee, 2020-2021.

These Hazard Annexes describe the characteristics, location, extent, history, and probability for each hazard addressed in the *2021 Umatilla County NHMP*. Probability and vulnerability are described and use the OEM Methodology; see the full description of the OEM Methodology in Volume I, Section 2 Risk Assessment. The Risk Assessment and the Hazard Annexes comprise and provide a risk analysis and vulnerability assessment for the natural hazards identified by Umatilla County. Additional information pertaining to the types and characteristics of each natural hazard is available in the *2020 Oregon Natural Hazards Mitigation Plan,* Region 5 Mid-Columbia Risk Assessment.

The Hazard Annexes and Volume I Section 2 Risk Assessment are further supplemented by the climate change information provided by the Oregon Climate Change Research Institute (OCCRI).

Predicted Climate Variability

Temperatures increased across the Pacific Northwest by 1.3˚F in the period 1895–2011 (the observed record). In that same timeframe, Cascade Mountain snowpacks have declined, and higher temperatures are causing earlier spring snowmelt and spring peak streamflows. In Oregon's forested areas, large areas have been impacted by disturbances that include wildfire in recent years, and climate change is probably one major factor. There is an increasing amount of research on how climate change influences wildfire and other hazards in the Pacific Northwest.

As part of the HMGP grant for this NHMP update, the Department of Land Conservation and Development (DLCD) contracted with the Oregon Climate Change Research Institute (OCCRI) to provide an analysis of climate change influences on natural hazards. The collaboration resulted in products which provide information regarding the influence and impacts of climate change on existing natural hazards events such as but not limited to heavy rains, river flooding, droughts, heat waves, cold waves, wildfire, and air quality.

The products include:

- *Future Climate Projections: Umatilla County* (see Appendix E) (also on DLCD's website https://www.oregon.gov/lcd/CL/Pages/Climate-Change-Resources.aspx)*;*
- *Climate Change Two-Pager;* and
- *Future Climate Change Projections to Support Umatilla County Natural Hazard Mitigation Planning* (Meghan Dalton's presentation at the 10/27/20 NHMP Steering Committee meeting).

The basis of the research prepared by OCCRI uses future climate projections derived from 10–20 global climate models and have been "downscaled" - made locally relevant. Several climate metrics that relate to natural hazards are being calculated for historical and mid-21st century periods under two future emissions scenarios (RCP 4.5 and RCP 8.5 as explained in the report) that result in varying future temperature increases for Oregon.

The report describes county-specific projected changes in climate metrics related to the selected natural hazards. The report presents future climate projections for the 2020s (2010-2039 average) and the 2050s (2040-2069 average) compared to the 1971-2000 average historical baseline. Each hazard in the report has a box highlighting "key messages" that call out the main points of the research and analysis for that hazard.

Table HA-2 provides an overview of expected climate change impacts for Umatilla County. The table shows the direction of change (increasing, decreasing, unchanging) and indicates the level of confidence in direction of change (high, medium, low).

According to the OCCRI reports:

- There is very high confidence that heat waves will increase and that cold waves will decrease.
- There is high confidence heavy rains, wildfire, flooding, and loss of wetlands will increase.
- There is medium confidence that droughts and prevalence of invasive species will increase.
- There is low confidence that wind storms will remain unchanged, dust storms will decrease, and poor air quality will increase.

The overview describes results for the natural hazards using climate metrics in summary and as a comparison. For more information see the OCCRI reports in Appendix E. Of note, the climate metrics used by OCCRI do not exactly match the natural hazards identified by Umatilla County.

After Table HA-2 Overview of Expected Climate Change Impacts for Umatilla County, there is a list of changes from the *2014 Umatilla County NHMP* to the *2021 Umatilla County NHMP*, and a list of maps included in the Hazard Annexes.

Table HA–2 Overview of Expected Climate Change Impacts for Umatilla County

Natural Hazards							
Heat Waves	↑↑	Heavy Rains	↑↑	Droughts	↑↑	Poor Air Quality	↑↑
Cold Waves	↓↓	Wildfire	↑↑	Increased Invasive Species	↑↑	Dust Storms	↓↓
		Flooding	↑↑			Wind Storms	=
		Loss of Wetlands	↑↑				

Color	Level of Confidence in Direction of Change	Expected Direction of Change	
	Very High Confidence		
	High Confidence	Risk Increasing	↑↑
	Medium Confidence	Risk Decreasing	↓↓
	Low Confidence	Risk Unchanging	=

Source: OCCRI, *Future Climate Projections: Umatilla County*, October 2020.

Of note, the author of *Future Climate Projections: Umatilla County*, Meghan Dalton provided two ways on how not to use this Information and four possible ways to use this information:

- These are NOT weather predictions;
- These should NOT be used for engineering/design;
- Envision how current systems may respond under climate conditions different from those the systems were designed to operate under;
- Evaluate potential mitigation actions to accommodate future conditions (e.g., NHMP);
- Explore a range of plausible future outcomes taking into consideration the climate system's complex response to increasing greenhouse gases; and
- Influence the assessment of likelihood of a particular climate-related hazard risk.[1]

[1] Meghan Dalton, OCCRI, *Future Climate Change Projections to Support Umatilla County Natural hazard Mitigation Planning*, presented 10/27/20 at the Umatilla County NHMP Steering Committee meeting

Notable Changes to the Risk Assessment and Hazard Annexes from the 2014 NHMP to the 2021 NHMP

Notable changes from the *2014 Umatilla County NHMP* to the *2021 Umatilla County NHMP* for the Risk Assessment (see Volume I Section 2) and these Hazards Annexes include:

- The Hazard Annexes were significantly altered for clarity. Hazard identification, characteristics, history, probability, vulnerability, and hazard specific mitigation activities were updated. Extraneous information was removed and links to technical reports, studies, and data were added.
- Hazard Annexes include information for Umatilla County, the twelve incorporated Cities, and four special districts together (previously the Cities of Adams, Pilot Rock, and Umatilla were in separate addenda and they were the only Cities participating).
- All hazard subsections have been reformatted to emphasize characteristics, location and extent, history, probability, and vulnerability.
- The addition of new hazard history events in all hazards.
- The addition of more extensive climate change information.
- Maps depicting hazard location and local vulnerability were added whenever available.
- Previously included statistics and information was updated with most current data.
- The supplemental report from OCCRI (described above, in the Hazard Annexes, and in Appendix E) was researched and written; information has been integrated into the NHMP.

The Hazard Annexes include the following full page natural hazards maps:

- FL-4 Flood Hazard: Floodplain Map Vicinity Map (Map 1)
- FL-5 Flood Hazard: Floodplain Map West County (Map 2)
- FL-6 Flood Hazard: Floodplain Map Central County (Map 3)
- FL-7 Flood Hazard: Floodplain Map East County (Map 4)
- FL-8 Flood Hazard: Floodplain Map Ukiah (Map 5)
- FL-9: Flood Hazard: Floodplain Map Milton-Freewater (Map 6)
- FL-10: Flood Hazard: Floodplain Map Mill Creek (Map 7)
- WF-12 Wildfire Hazard: Fire Protection Districts
- WF-13 Wildfire Hazard: Community Wildfire Protection Areas within Umatilla County
- WF-14 Wildfire Hazard: Wildfire History
- WF-15 Wildfire Hazard: Burn Probability
- WF-16 Wildfire Hazard: Wildfire Risk to Property and People
- WF-17 Wildfire Hazard: Wildfire Risk to Assets
- WF-18 Wildfire Hazard: Overall Wildfire Risk
- WF-19 Wildfire Hazard: Wildfire Smoke Sensitivity (Smoke Sensitive Receptor Areas)
- WF-20 Wildfire Hazard: Wildfire Weather Zones
- DR-3 Drought Hazard: Critical Groundwater Areas
- DR-4 Drought Hazard: Crop Land Cover
- EQ-3 Earthquake Hazard: Earthquake History
- EQ-4 Earthquake Hazard: Faults and Fault Lines
- EQ-5 Earthquake Hazard: Expected Shaking
- EQ-6 Earthquake Hazard: Cascadia Subduction Zone (CSZ) Magnitude 9 Susceptibility
- LS-3 Landslide Hazard: Landslide Inventory
- LS-4 Landslide Hazard: Landslide Susceptibility

FLOOD HAZARD ANNEX

Risk Score: 240

Risk Level: High

Causes and Characteristics of Flood

Flooding results when rain and snowmelt creates water flow that exceeds the carrying capacity of rivers, streams, channels, ditches, and other watercourses. In Oregon, flooding is most common from October through April when storms from the Pacific Ocean bring intense rainfall. Most of Oregon's most destructive natural disasters have been floods.[1] Flooding can be aggravated when rain is accompanied by snowmelt and frozen ground; the spring cycle of melting snow is the most common source of flood in the region.

Anticipating, planning, and mitigating for flood events is an important activity for Umatilla County. Federal programs provide insurance and funding to communities engaging in flood hazard mitigation. The Federal Emergency Management Association (FEMA) manages the National Flood Insurance Program (NFIP) and the Hazard Mitigation Assistance (HMA) program. The HMA includes these grant programs: Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) program, and the Building Resilient Infrastructure and Communities (BRIC) program.

- The NFIP provides flood insurance and pays claims to policyholders who have suffered losses from floods.
- The HMA provides grants to help in a broad range of areas including mitigating flood hazards by elevating structures or relocating or removing them from flood hazard areas.
- The HMGP provides funding to state, local, tribal and territorial governments so they can rebuild in a way that reduces, or mitigates, future disaster losses in their communities. This grant funding is available after a presidentially declared disaster.
- The FMA program is a competitive grant program that provides funding to states, local communities, federally recognized tribes and territories. Funds can be used for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the NFIP.
- The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.[2]

These programs provide grant money to owners of properties who have suffered losses from floods, and in some cases, suffered losses from other natural hazard events.

In the *2014 Umatilla County NHMP*, floods were ranked in third place out of the nine natural hazards. Five of the hazards had no score. In the *2021 Umatilla County NHMP*, floods are ranked in first place, with 240/240 points. There are nine hazards (removed weather emergencies and added air quality) in the *2021 Umatilla County NHMP*.

[1] Taylor, George H. and Chris Hannan, *The Oregon Weather Book*. Corvallis, OR: Oregon State University Press, 1999.

[2] FEMA, *Hazard Mitigation Assistance Grants*, https://www.fema.gov/grants/mitigation

The principal types of flood that occur in Umatilla County are described here.

Snowmelt (Spring) Flooding

Flooding throughout the region is most commonly linked to the spring cycle of melting snow. However, rain-on-snow floods, common in Western Oregon, also occur east of the Cascades. The weather pattern that produces these floods may occur during the winter or spring months and has come to be associated with La Nina events, a three to seven year cycle of cool, wet weather. In brief, cool, moist weather conditions are followed by a system of warm, moist air from tropical latitudes. The intense warm rain associated with this system quickly melts foothill and mountain snow. Above-freezing temperatures may occur well above pass levels (4,000-5,000 feet). Some of Oregon's most devastating floods are associated with these events.

Local Flash Floods

Summer thunderstorms are common throughout the region. During these events, normally dry gulches can quickly become raging torrents, a flash flood. Flash floods are most common to Eastern Oregon. This is because summer temperatures are much higher east of the Cascades and thunderstorms are common during the summer months. Although flash flooding occurs throughout Oregon, local geology in the region can increase the impact of this hazard. Bedrock, composed mostly of igneous rocks, is exposed at the surface throughout much of the region. Consequently, runoff is increased significantly.

All Flooding

Umatilla County is adjacent to the Columbia River. Besides the Columbia River, the two larger rivers of Umatilla County are the Umatilla River and Walla Walla River. Southern Umatilla County encompasses a small portion of the John Day Watershed, although very little development impact or natural disaster potential has been identified for this segment of the main stem John Day River system within Umatilla County. The Umatilla River and Walla Walla River meander directly through 6 of the 12 incorporated cities in Umatilla County. Each of the 12 incorporated cities have frontage on one of Umatilla County's many small and large streams. The Umatilla River, Walla Walla River and their tributaries are the primary flood concerns in Umatilla County. Mill Creek is technically a tributary of the Walla Walla River and is definitely a flood concern.[3] See the "History of Flooding in Umatilla County" later in this Flood Annex for additional information.

Flood is one of the identified climate change metrics in OCCRI's *Future Climate Projections* report. The OCCRI report provides description of the present with a look at two future emissions scenarios, RCP 4.5 and RCP 8.5.

> "The projected change in the mean monthly hydrograph of the Columbia River at McNary is shown in Figure 12 and of the Umatilla River at Pendleton is shown in Figure 13. On the Columbia River at McNary, the monthly hydrograph is characteristic of a snow-dominated basin with peak flows during the late spring snowmelt season (Figure 12). On the Umatilla River at McKay, the monthly hydrograph is characteristic of a mixed rain-snow basin with peak flows during the early to mid-spring snowmelt season and a smaller peak in late fall to early winter reflecting rainfall contributions early in the water year (Figure 13). By the 2050s

[3] *2014 Umatilla County NHMP*, May 2015.

(2040–2069), under both emissions scenarios, the peak streamflow in both rivers is projected to shift earlier in the spring as warmer temperatures cause the snowpack to melt earlier. In addition, winter streamflow is projected to increase due to increased winter precipitation and that precipitation falling more as rain than snow."[4]

Dam Failure

Major flooding could result from partial or complete failure of man-made structures constructed to restrict the flow of water on Umatilla County's waterways, either impounding reservoirs or diversion dams. There are 9 dams located in Umatilla County that meet the statutory definition and are listed in the Oregon Water Resources Department's dam inventory database (https://apps.wrd.state.or.us/apps/misc/dam_inventory/).The statutory definition is a dam that is 10 feet or higher and has a capacity for storage of at least 3 million gallons of water. This definition includes all the Bureau of Reclamation dams.[5] See Table FL-6 for the categorization of those as high, medium, and low hazard level dams. Dams are further discussed in the Hazard Vulnerability section of this Flood Hazard Annex.

Factors that contribute to flooding in Umatilla County

Precipitation

Umatilla County, Oregon gets 16 inches of rain, on average, per year. The U.S. average is 38 inches of rain per year. Umatilla County averages 14 inches of snow per year. The U.S. average is 28 inches of snow per year. On average, there are 192 sunny days per year in Umatilla County. The U.S. average is 205 sunny days. Umatilla County gets some kind of precipitation, on average, 100 days per year. Precipitation is rain, snow, sleet, or hail that falls to the ground. For precipitation to be counted there has to be at least .01 inches on the ground to measure.[6]

Geography

Umatilla County, located near the northeast corner of Oregon, has a land area of 3,215 square miles, making it the eighth largest county in the state in terms of geographic area. It varies in width from 22 to 70 miles, and is approximately 70 miles in length from north to south. It is bounded on the west by Morrow County, on the south by Grant County, on the east by Wallowa and Union Counties, and on the north by Walla Walla and Benton Counties in the State of Washington. The topography in Umatilla County ranges from mountainous terrain in the southern part to high, rolling prairies in the north. Most of the Basin area, including the Blue Mountain uplands, is gently sloping. Expansive plateaus, steppes and rolling hills are incised by the narrow and steep-walled valleys of the Umatilla River drainage.[7] Additional geographic information is provided in the Community Profile of this *2021 Umatilla County NHMP*.

[4] OCCRI, *Future Climate Projections: Umatilla County*, October 2020.

[5] Keith Mills, Oregon Water Resources Department, personal communication, December 27, 2018.

[6] Best Places, *Climate in Umatilla County, Oregon*, Umatilla County, Oregon Climate (bestplaces.net), accessed 1/21/21

[7] *2014 Umatilla County NHMP*, May 2015

Location of Development

There are twelve incorporated cities in Umatilla County and all are participating in *2021 Umatilla County NHMP*. They are located throughout the County and are shown on maps through the NHMP.

In Umatilla County, 23.5% of the land is owned by federal agencies. Of the federal lands owned, 37.6% are Type A lands. The Type A lands are those that are primarily managed for natural, cultural, and recreational features.[8] The U.S. Forest Service owns 19.5% of the federal lands in Umatilla County. The Bureau of Land Management, the National Park Service, the military, and other are the additional categories of federal land ownership.[9] State and local agencies also have land holdings.

The land developed with residences on private land in Umatilla County changed from 2000 to 2010, increasing by 12.1%. Of those residential private lands that are developed, some are in the wildland-urban interface (WUI). In 2010, 6.3% of the WUI land in Umatilla County had been developed.[10]

When development is located in the floodplain, it may cause floodwaters to rise higher than before the development was located in the hazard areas. This is particularly true if the development is located within the floodway. When structures or fill are placed in the floodplain, water is displaced. Development raises the base-flood elevation by forcing the river to compensate for the flow space obstructed by the inserted structures. Over time, when structures or materials are added to the floodplain and no fill is removed to compensate, serious problems can arise. Umatilla County and the twelve incorporated cities have floodplain development requirements.

Displacement of a few inches of water can mean the difference between no structural damage occurring in a given flood event and the inundation of many homes, businesses, and other facilities. Careful attention must be paid to development that occurs within the floodplain and floodway of a river system to ensure that structures are prepared to withstand base flood events.

Surface Permeability

In urbanized areas, increased pavement leads to an increase in volume and velocity of runoff after a rainfall event, exacerbating potential flood hazards. Stormwater systems collect and concentrate rainwater and then rapidly deliver it into the local waterway. Traditional stormwater systems are a benefit to urban areas, by quickly removing captured rainwater. However, they can be detrimental to areas downstream because they cause increased stream flows due to the rapid influx of captured stormwater into the waterway. It is very important to evaluate stormwater systems in conjunction with development in the floodplain to prevent unnecessary flooding to downstream properties. Frozen ground is another contributor to rapid runoff in the urban and rural environment.

[8] Umatilla County BLM Summary 5/26/20, created from this website, https://headwaterseconomics.org/tools/economic-profile-system/

9 Ibid.

[10] Umatilla County BLM Summary 5/26/20, created from this website, https://headwaterseconomics.org/tools/economic-profile-system/

Terms Related To Flooding

Floodplain

A floodplain is land adjacent to a river, stream, lake, estuary or other water body that is subject to inundation of water, otherwise known as flooding. These areas, if left undisturbed, act to store excess floodwater. The floodplain is made up of two areas: the flood fringe and the floodway. These are described below and illustrated in Figures FL-1 and FL-2.

Floodplains perform functions valuable to humans and wildlife. Important functions of the floodplain include: flood water storage, water quality maintenance, fish and wildlife habitat, and recreation/open space. Floodplains provide important habitat areas including river channels, riparian buffers, and wetlands. The variety of habitat types, the presence of water, and other factors result in a rich diversity of plant and animal species. Also, vegetation that grows in the floodplain influences how water flows across the land and can play a major role in controlling erosion and sediment deposition. When these features are lost, habitat and species diversity suffer.[11]

Under the National Floodplain Insurance Program (NFIP), areas that have a 1% chance in any given year of being covered by flood waters are mapped as a Special Flood Hazard Areas (SFHA), requiring floodplain management according to NFIP standards.[12] SFHA is the area where flood insurance is typically required for structures with federally-backed mortgages. The SFHA represents inundation from a given flooding source, such as a river, ocean, or lake, during a 1 percent annual chance probability (aka 100-year) flood event. The Base Flood Elevation (BFE) is the elevation of the 100-year flood event at a specific location in the SFHA.[13]

Floodway

The floodway is the portion of the floodplain that is closer to the river or stream. For NFIP and regulatory purposes, floodways are defined as the channel of a river or stream, and the over-bank areas adjacent to the channel. Unlike floodplains, floodways do not reflect a recognizable geologic feature. The floodway carries the bulk of the floodwater downstream and is usually the area where water velocities and forces are the greatest. See Figures FL-2 and FL-3.

NFIP regulations require that the floodway be kept open and free from development or other structures, so that flood flows are not obstructed or diverted onto other properties. Floodways are not mapped for all rivers and streams but are typically mapped in developed areas.

According to FEMA, a "Regulatory Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream

[11] Oregon Department of Land Conservation and Development, *National Flood Insurance Program (NFIP) in Oregon*, https://www.oregon.gov/lcd/NH/Pages/NFIP.aspx, accessed December 26, 2018.

[12] Ibid.

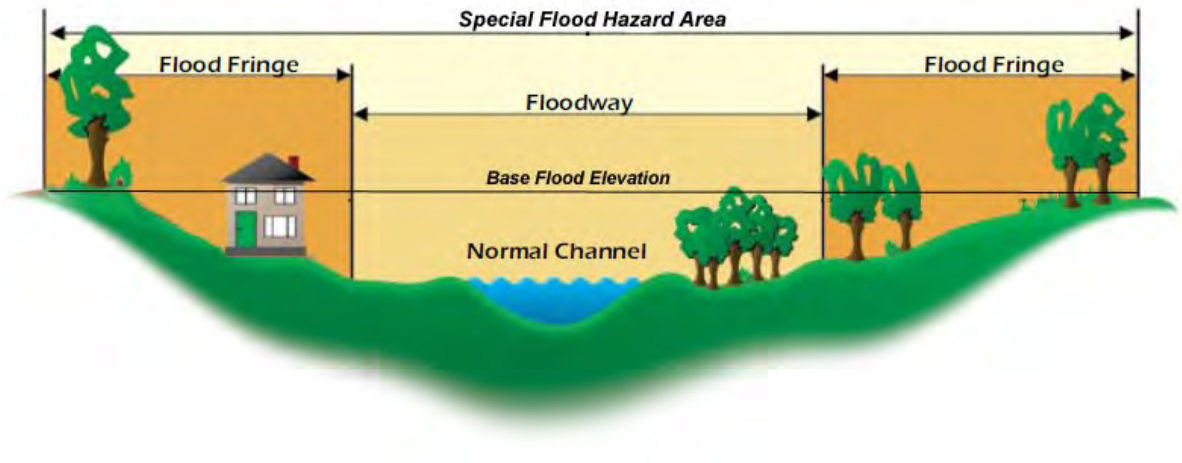
[13] DOGAMI, *Base Flood Elevation Determinations Fact Sheet*, https://www.oregongeology.org/pubs/fs/BFE-fact-sheet.pdf, accessed December 26, 2018.

flood elevations. For streams and other watercourses where FEMA has provided Base Flood Elevations (BFEs), but no floodway has been designated, the community must review floodplain development on a case-by-case basis to ensure that increases in water surface elevations do not occur, or identify the need to adopt a floodway if adequate information is available.[14]

The Flood Fringe

The flood fringe refers to the outer portions of the floodplain, beginning at the edge of the floodway and continuing outward. This is the area where development is most likely to occur, and where precautions to protect life and property need to be taken.

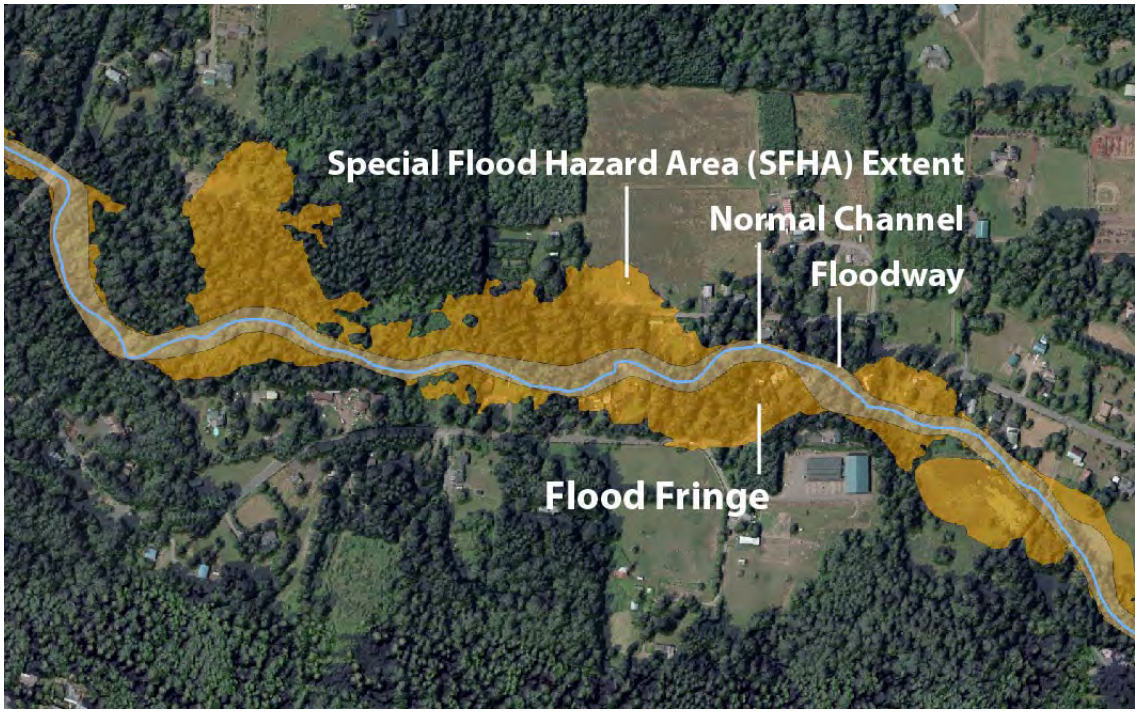
Figure FL-1 Cross Section View of the SFHA and its Components



Source: DOGAMI, *Base Flood Elevation Determinations Fact Sheet*, https://www.oregongeology.org/pubs/fs/BFE-fact-sheet.pdf, accessed December 26, 2018.

[14] FEMA, *Definition of Floodway*, https://www.fema.gov/floodway, accessed December 26, 2018.

Figure FL-2 Map View of the SFHA and its Components



Source: DOGAMI, *Base Flood Elevation Determinations Fact Sheet*, https://www.oregongeology.org/pubs/fs/BFE-fact-sheet.pdf, accessed December 26, 2018.

History of Floods in Umatilla County

Records of past flooding in Umatilla County vary greatly depending on location. For example, records of flooding on McKay Creek and Mill Creek have been kept since the late 1800s while records on streams like Wildhorse Creek and Squaw Creek rely on anecdotal information from long term residents. This is due to the fact that river gages are typically installed in areas where a waterway runs close to structures or heavily settled areas. Gages are maintained by many different authorities, including the United States Geographical Survey (USGS), the National Weather Service (NWS), the Bureau of Reclamation (USBR) and local water control and irrigation districts. Gages are owned by various authorities as well, including USGS, USBR, and the Bureau of Indian Affairs (BIA).[15]

For this discussion of the history of floods in Umatilla County, there are multiple sources of information which, when put together, provide an overall background that frames the present and the future. Flooding has continued to be very impactful in Umatilla County with multiple large floods occurring since the writing of the *2014 Umatilla County NHMP*. The Umatilla County NHMP Steering Committee, during the Hazard Vulnerability Analysis (HVA) for this *2021 Umatilla County NHMP*, determined a risk score of 240 out of 240 points for floods. Floods were identified with the #1 rank out of the nine identified hazards for Umatilla County. This was described in the Risk Assessment.

It is important to note that floods do not have to be categorized with a disaster declaration by FEMA to be impactful. Impacts can occur at any level of flooding. In the Risk Assessment, in Table 2-2

[15] *2014 Umatilla County NHMP*, May 2015

FEMA Major Disaster, Emergency, and Fire Management Declarations for Umatilla County, there are five flood disasters in the list of eleven disasters. The five are excerpted here in Table FL-1.

Table FL-1 FEMA Major Disaster Flood-Related Declarations for Umatilla County (excerpted from Table 2-2 in the Risk Assessment)

Declaration Number	Declaration Date	Incident Period	Incident/Type of Damages	Individual Assistance	Public Assistance Categories
DR-4519	April 3, 2020	February 5-9, 2020	Severe Storms, Flooding, Landslides, and Mudslides	Provides IA & PA funds.	DR-4519 provides IA & PA funds.
DR-4452	July 9, 2019	April 6-21, 2019	Severe Storms, Flooding, Landslides, and Mudslides	Does not provide IA funds.	DR-4452 provided PA funds.
DR-1160	Jan. 23, 1997	Dec. 25, 1996 to Jan. 6, 1997	Severe winter storm/flooding	None	A, B, C, D, E, F, G
DR-1099	Feb. 9, 1996	Feb. 4, 1996 to Feb. 21, 1996	High winds, severe storms, and flooding	Provides IA, PA, and HMGP funds.	A, B, C, D, E, F, G
DR-184	Dec. 24, 1964	Dec. 24, 1964	Heavy rains and flooding	Yes	A, B, C, D, E, F, G

Source: FEMA, *Declared Disasters, Oregon,* https://www.fema.gov/disasters/disaster-declarations?field_dv2_state_territory_tribal_value=OR&field_year_value=1996&field_dv2_declaration_type_value=All&field_dv2_incident_type_target_id_selective=All, accessed 12/29/20; FEMA, https://recovery.fema.gov/state-profiles/HistoricalDisasterData, accessed 12/29/20; DR-1160 info about IA and PA confirmed, and DR-1099 info about IA and PA provided by Joseph Murray, OEM, personal communication, 5/11/21.

Note the floods in 2019 and 2020 that were declared as major flood disasters. As DLCD staff and the Umatilla County NHMP Steering Committee write this *2021 Umatilla County NHMP*, the recovery efforts and planning efforts continue related to these two floods.

As part of this NHMP update, NOAA/NWS Warning Coordination Meteorologist, Marcus Austin, of the Pendleton, Oregon office, prepared a list, "Hazardous Weather in Umatilla County, October 2006 – March 2020" and sent it to Tom Roberts of Umatilla County by email on 4/27/20. The flooding information below was excerpted from the full list of hazardous weather.

Table FL-2 Hazardous Weather in Umatilla County – Floods – October 2006 to March 2020

Hazardous Weather in Umatilla County – Floods – October 2006 to March 2020	
Flash Flooding	
Date	**Description**
June 4, 2007	Heavy rain and flash flooding near Ukiah.
May 17, 2010	Flash flooding with ditch erosion and water in some basements near the Pendleton Airport.
May 14, 2011	Heavy rain and snowmelt lead to flash flooding in some areas.
July 16, 2012	Heavy rain triggered flash flooding and a mudflow that impacted Helix. This damaged 16 roadways and inundated several homes and basements.
September 5, 2013	Flash flooding reported near Holdman and east of Fulton.
May 22, 2015	Flash flooding due to slow moving storms over Pilot Rock.
June 26, 2017	Flash flooding near Pendleton Airport along Airport Road.
River Flooding - Several occurrences mainly late Winter/early Spring	
January 16-18, 2011	Minor to moderate flooding along the Umatilla River from Gibbon to Echo due to heavy rain on snow.
April 19-20, 2013	Flooding along the Umatilla River at Bingham Springs, Gibbon and Pendleton due to heavy rain on snow.
March 10-11, 2014	Flooding along the Umatilla River from Gibbon to Umatilla due to heavy rain on snow.
March 16, 2017	Minor flooding along the Umatilla River at Gibbon due to heavy rain and snow melt.
February 4-5, 2018	Minor flooding along the Umatilla River at Gibbon and Walla Walla River near Milton Freewater due to heavy rain and snow melt.
April 9-10, 2019	Flooding in Ukiah due to a breached levee along Camas Creek.
April 9-13, 2019	Flooding of McKay neighborhood due to planned dam release from McKay Reservoir. Record mountain snowpack coupled with heavy rains lead to record inflows into the reservoir, requiring excess release and flooding downstream through McKay neighborhood.
April 10-12, 2019	Flooding along the Umatilla River from west of Pendleton to Umatilla due to increased flows from McKay Creek release/inflow.
February 6-8, 2020	Historic flooding along the Umatilla and Walla Walla Rivers with extensive damage to areas around Milton Freewater, Cayuse/Mission and Pendleton as well as rural areas of the county.

Source: Marcus Austin, NOAA/NWS Warning Coordination Meteorologist, Marcus Austin, of the Pendleton, Oregon office, personal communication, 4/27/20

For additional background on floods in Umatilla County, this *2021 Umatilla County NHMP* retains information that was included in the *2014 Umatilla County NHMP*.

The Table FL-3 Worst Floods in Umatilla County is an updated version of Table 5-4, Worst Floods in Umatilla County, in the *2014 Umatilla County NHMP*. It provides a review of gage information from sites on the Umatilla and Walla Walla Rivers. This table shows that most of the heaviest flooding takes place from December through February. The gage on the Umatilla River, located at Pendleton, has provided flood data for more than 100 years. In 2018 the bank gage location was moved upstream from its previous location. Currently, the bank full stage in Pendleton is 11.0 feet (previously it was 6.4 feet) and flood stage begins at 12.3 feet (previously it was 7.8 feet). The Umatilla River will cause moderate flooding at 8.0 feet and major flooding when the gage reads 11.0 feet (NWS, 1997). Table FL-3 shows the thirteen highest flood stages and water flow levels ever

taken from the Pendleton gage. For comparison purposes, the crest of the Umatilla River during the February 1996 floods was measured at 11.0 feet.[16]

The Walla Walla River near Touchet, Washington includes water drained from Mill Creek, Couse Creek, Pine Creek, Dry Creek, and others in Oregon. Much of the land drained by the Walla Walla River is in Washington. Bank full stage of the Walla Walla at Touchet is 10.0 feet and flood stage is considered 13.0 feet. Table FL-3 shows the six worst floods on record since 1951 when continuous gaging began at his location.[17] High water flood events listed in Table FL-3 do not necessarily represent the most devastating floods in terms of damage claims and property loss. Note, according to the Farm Services Agency, flooding in 1995 was much more costly in terms of crop damages than the higher water events of 1996 and 1997 (K. Jordan, personal communication, 1997).[18]

Table FL-3 Worst Floods in Umatilla County (Based on Stage and Flow)

Date of Flood Measurements	Stage in Feet	Flow in Cubic Feet Per Second
Umatilla River at Pendleton, OR (the location of the gage was moved upstream from previous in 2018, which changed the action and flood stage)		
February 6, 2020	19.62	28,900
April 10, 2019	13.1	10,100
December 14, 1882	12.5	17,000
May 30, 1906	12.1	15,500
January 30, 1965	12.1	15,500
February 22, 1949	12.1	15,400
December 12, 1946	11.6	13,7000
December 29, 1945	11.6	12,4000
January 25, 1975	11.5	14,082
April 1, 1931	11.5	13,500
December 23, 1964	11.4	12,300
February 8, 1997	11.2	13,432
February 23, 1986	10.16	16,200
Bank Full Level (Action Stage)	11.0 (previously 6.4)	7,200 (previously 3,380)
Flood Stage	12.3 (previously 7.8)	9,000 (previously 6,139)
Walla Walla River near Touchet, WA		
February 10, 1996	20.58	32,500
February 8, 2020	20.26	32,000
December 22, 1964	18.9	33,400
February 12, 1985	15.5	12,200
January 6, 1969	14.1	14,600
January 30, 1965	13.7	15,800
Bank Full Level	10.0	3,780
Flood Stage	13.0	7,220

Source: Marilyn Lohmann, National Weather Service, personal communication, 3/3/21 updated the Table 5-4 from the *2014 Umatilla County NHMP* which identified the source of information as the National Weather Service River Forecast Points Summary, 1997.

[16] *2014 Umatilla County NHMP*, May 2015

[17] *2014 Umatilla County NHM*P, May 2015

[18] Ibid.

To provide additional context about floods, let's look at some flood related information for Oregon.

Table FL-4 Significant Historic Floods in Oregon

Date	Location	Type of Flood	Description
May 1948	Columbia River	River flooding	Columbia River crested at 34.4 ft. Flood stage at that time was 15 ft. This is the flood that destroyed the City of Vanport. Fifteen people died in the flood.
Dec. 1955	Statewide	Rain on snow	DR-49. Event occurred on December 29, 1955. Flooding and strong winds; 5 fatalities.
Jul. 1956	Statewide	Storms, flooding	DR-60. Event occurred on July 20, 1956. Storms and flooding.
Mar. 1957	Statewide	Flooding	DR-69. Event occurred on March 1, 1957.
Oct. 1962	Statewide	Storms	DR-136. Event occurred on October 12, 1962. Referred to as the Columbus Day Storm.
Feb. 1963	Statewide	Flooding	DR-144. Event occurred on February 25, 1963.
Dec. 1964	Statewide	Heavy rains, flooding, rain on snow	DR-184. Event occurred on December 24, 1964. Statewide damage totaled $157 million and 17 deaths. Lake County was affected.
Jan. 1974	Western Oregon	Rain on snow, flooding	DR-413. Flooding resulted from rain on snow events. Willamette River at Portland crested at 25.7 feet. Nine counties declared disasters.
Feb. 1986	Statewide	Snow melt, flooding	Intense rain, a melting snow, and flooding. Some homes evacuated. Event occurred February 22-23.
Jul. 1989	South and Central Oregon	Flooding	On July 15, there was snow melt flood in Lake and neighboring counties. Warm rains caused extensive snowpack melt which occurred quickly; many rivers and creeks overflowed.
1990	Western Oregon	Rain on snow, flooding	Ten rivers in eight counties were flooding in a rain-on-snow weather event. Many bridges were washed away.
Jul. 1995	Statewide	Flooding	DR -1061. Event occurred July 8 to July 9, 1995.
Feb. 1996	Statewide	Storms, flooding, rain on snow	DR-1099. Winter storms with rain, snow, ice, floods, and landslides. Power outages, road closures and property damage. Warm temperatures, record breaking rains; extensive flooding in Multnomah County; widespread closures of major highways and secondary roads; 8 fatalities. There are 27 counties covered by the disaster declaration.
Dec. 1996-Jan. 1997	Statewide	Winter storm, flooding	DR-1160. Severe snow and ice. Up to 4 to 5 inches of ice in the Columbia Gorge. Interstate 84 closed for 4 days. Hundreds of downed trees and power lines. Lake County received $219,382; Lakeview receive $30,701, and Paisley received $2,909 from FEMA to repair and replace damaged structures.
Jan.-Feb. 1999	NW Oregon	Rain, flooding, landslides, mudslides	Widespread flooding on smaller rivers and streams; numerous landslides and mudslides.
Dec. 2005 to Jan. 2006	Statewide	Flooding	DR-1632. Severe storms, flooding, landslides, and mudslides Heavy rains and rapidly melting snow contributed to hundreds of landslides / debris flows across the state; many occurred on clear cuts that damaged logging roads. Approximately $500,000 in property damage in Klamath and Lake Counties, with $225,000 in Lake County.
Nov. 2006	Statewide	Severe storms, flooding, landslides, mudslides	DR-1962. The events occurred November 6-8, 2006. Total rainfall for November was 14.67 inches in Hood River County; the previous record was 11.09 in 1973. Total estimated damages: $27 million.
Dec. 2007-Jan. 2008	NW Oregon	Winter storms, heavy rain, flooding	DR-1824. Severe winter storm, flooding, winds, record and near record snow, landslides and mudslides. Gresham received, 26" of snow. Many roads closed. Significant damages to public infrastructure, homes and businesses.
Dec. 2008	Statewide	Winter storms, heavy rain, flooding	DR-1824. Severe winter storm, flooding, winds, record and near record snow, landslides and mudslides. Gresham received, 26" of snow. Many roads closed. Significant damages to public infrastructure, homes and businesses. Event occurred Dec. 20-26.

Date	Location	Type of Flood	Description
Jan. 2011	Statewide	Winter storm	DR-1956. Severe winter storm, flooding, mudslides, landslides, and debris flows.
Jan. 2012	W. Oregon	Severe winter storms, flooding, landslides, mudslides	DR-4055. The incident period was January 12-21, 2012. Severe winter storm with flooding, landslides, and mudslides. Declaration involves 12 counties including Hood River County.
Dec. 2015	Western Oregon	Winter storm, heavy rain	DR-4258. Severe winter storms, straight-line winds, flooding, landslides, and mudslides.

Sources: University of Oregon, Umatilla County NHMP, May 2015; DLCD, Oregon NHMP, 2015; FEMA, Disaster Declarations for Oregon, retrieved 2017; Taylor and Hatton, 1999.

In looking at Figure FL-3, showing the major drainage basins, streams, rivers, and lakes in Oregon, it is clear that Umatilla County has numerous drainage basins, streams, rivers, and lakes. Within Table FL-4 Significant Historic Floods provides details on the date, location, type of flood, and a description of the flood that occurred in Oregon.

Local, state, and federal agencies as well as other organizations are actively involved in mapping flood hazard areas and working on flood hazard issues in Umatilla County. All involved must recognize the ability to assess the probability of a flood and the level of accuracy is influenced by modeling methodology advancements, better knowledge, longer periods of information on record for the water body in question, as well as communication and collaboration.

The *2021 Umatilla County NHMP* contains floodplain maps created by the Umatilla County GIS staff using FEMA floodplain data; these provide additional information about potential flood areas. Areas within a FEMA designated floodplain are found throughout Umatilla County. To most effectively view the information for Umatilla County, these floodplain maps are broken down into one vicinity map (Map 1) and six localized maps: West County (Map 2), Central County (Map 3), East County (Map 4), Ukiah (Map 5), Milton Freewater (Map 6), and Mill Creek (Map 7).

Figure FL-4 Flood Hazard: Floodplain Map Vicinity (Map 1)

Figure FL-5 Flood Hazard: Floodplain Map West County (Map 2)

Figure FL-6 Flood Hazard: Floodplain Map Central County (Map 3)

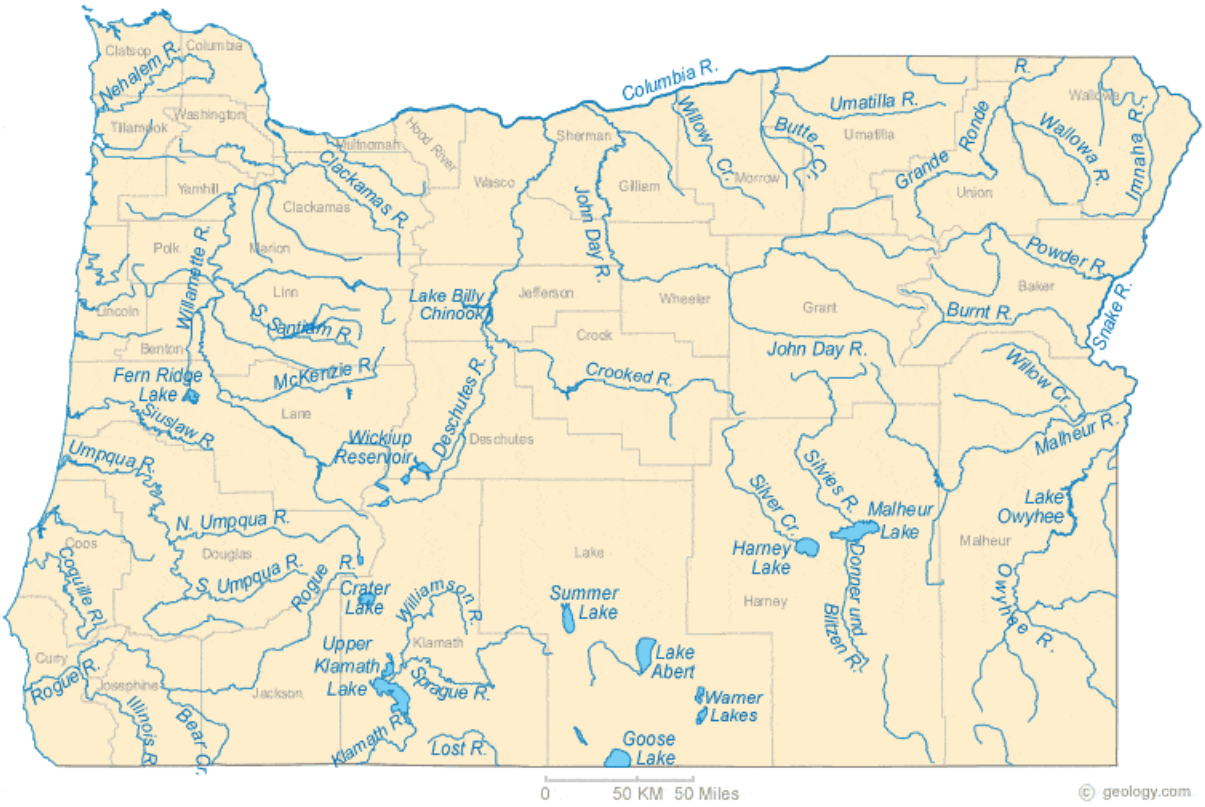
Figure FL-7 Flood Hazard: Floodplain Map East County (Map 4)

Figure FL-8 Flood Hazard: Floodplain Map Ukiah (Map 5)

Figure FL-9 Flood Hazard: Floodplain Map Milton-Freewater (Map 6)

Figure FL-10 Flood Hazard: Floodplain Map Mill Creek (Map 7)

Figure FL-3 Map of Major Drainage Basins, Lakes, Streams, and Rivers in Oregon



Source: Geology.com, Oregon Lakes, Rivers and Water Resources, https://geology.com/lakes-rivers-water/oregon.shtml

Risk Assessment

How are Hazards Identified?

Umatilla County's flood hazards are identified through its FEMA issued Flood Insurance Rate Maps (FIRM), in conjunction with its Flood Insurance Study (FIS). Flood records are often not well documented, particularly in unincorporated areas because their floodplains are sparsely developed. Incorporated areas tend to have more development in and documentation about floodplains.

Repetitive Flood Loss in Umatilla County

Repetitive flood loss properties (those which have experienced multiple flood insurance claims) have been identified as high priority hazard mitigation projects by the NFIP. Based on the FEMA CIS database, in Oregon, repetitive loss properties represent about 1.53% of all insured properties, and account for about 9.89% of all claims paid (23.3% of the dollar amounts paid).[19]

[19] Celinda Adair, National Floodplain Insurance Program Coordinator, DLCD, July 22, 2019.

A brief recap of Table FL-5 is included here:

- Umatilla County, the Cities, and the CTUIR have 298 National Flood Insurance Program (NFIP) policies in force as of 1/8/21.[20]
- There are 273 residential flood insurance policies and there are 25 non-residential flood insurance policies.[21]
- There have been 94 paid claims as of 1/8/21.[22]
- Private insurance is an option. As of 1/15/21, there are 105 private flood insurance policies at one independent insurance provider in Pendleton. There is no information on the total number of private flood insurance policies in the entirety of Umatilla County.[23]
- There have been two repetitive losses and no severe repetitive losses.[24]
- Umatilla County and the cities have had some Community Assistance Visit (CAV) and Community Assistance Contact (CAC) according to the FEMA Community Information System database and DLCD's records. See Table FL-5. [25]
- The City of Stanfield is member of the Community Rating System (CRS) but Umatilla County and the other jurisdictions are not.[26]

In the past several years, there has been an increase in the availability of private flood insurance and many people have chosen to obtain it. DLCD Natural Hazards Planner, Tricia Sears, talked via phone with Brenda Primer at Wheatland Insurance in Pendleton on 1/15/21. Brenda noted that private flood insurance policies are typically sold by independent insurance agencies. In Pendleton, she is one of four independent insurance agencies. She sells NFIP and private insurance. She thinks there are a lot of private insurance policies held in Umatilla County, but she is unable to ascertain a specific total number. She says typically the rates are better and less expensive than NFIP, and the policies can insure more than NFIP, up to $1 million, while the NFIP limit is $250,000. She says they are finding that if the private insurance pays out a policy holder, they then typically drop the policy holder (don't renew the policy). So then, with private flood insurance no longer an option, the policy holder turns to NFIP. She says she has about 150 flood insurance policies and probably 70% are private and 30% are NFIP. So that would be 105 private and 45 NFIP policies. She has no way of knowing how many private policies the other independent insurance agencies in Pendleton or elsewhere in Umatilla County have.

Identifying the number of NFIP and non-NFIP flood insurance policies can be very useful in many ways such as but not limited to for mitigation actions in the NHMP, and outreach and education.

[20] Katherine Daniel, Natural Hazards Planner, DLCD, 1/8/21.

[21] Ibid.

[22] Ibid.

[23] Brenda Primer, Insurance Agent, Wheatland Insurance, personal communication, 1/15/21

[24] Scott Van Hoff, Regional Flood Insurance Liaison, FEMA Region 10, 11/12/20

[25] Jason Gately, Natural Hazards Planner, DLCD, 4/1/20 and Katherine Daniel, Natural Hazards Planner, DLCD, 1/8/21

[26] FEMA, *Community Rating System Eligible Communities Effective October 1, 2020,* https://www.fema.gov/sites/default/files/2020-08/fema_crs_eligible-communities_oct-2020.pdf, accessed 1/7/21

Table FL-5 Flood Insurance Detail

Umatilla County NFIP Information									
Community	**Date of Last CAV or CAC**	**Date of Flood Ordinance**	**# of NFIP Insurance Policies**	**Member of CRS?**	**Average Annual Premium**	**# of Paid Loses**	**# of Repetitive Loss Properties**	**# of Severe Repetitive Loss Properties**	**# of Substantial Damage**
Umatilla County	8/30/11 CAV	8/3/10 – Ord 2010-05	91 (10 non-res)	no	$940	32	0	0	2
Adams	3/16/99 CAV	7/14/10 -Ord 240	11 (all res)	no	$1,033	0	0	0	0
Athena	5/21/99 CAV	2013	30 (3 non-res)	no	$545	2	0	0	0
Echo	02/25/63 CAC	Updated August 2010	4 (all res)	no	$830	1	0		0
Helix	05/16/94 CAV	Original 1984 Update 2010	22 (1 non-res)	no	$1,290	3	0	0	0
Hermiston	02/25/93 CAC	2019	1 (non-res)	no	$1,805	1	0	0	0
Milton-Freewater	09/11/90 CAC	2010	16 (2 non-res)	no	$763	2	0	0	0
Pendleton	05/17/94 CAV	August 6, 2010	69 (2 non-res)	no	$1,359	17	0	0	0
Pilot Rock	09/30/92 CAV	2001	17 (2 non-res)	no	$1,217	4	0	0	0
Stanfield	05/31/00 CAV	2017	2 (all res)	yes	$1,362	12	0	0	0
Ukiah	None	August 2010	2 (all res)	no	$382	0	0	0	0
Umatilla	04/01/85 CAV	Updated 2010	0	no	$0	0	0	0	0
Weston	03/18/99 CAV	8/11/20	5 (all res)	no	$1,634	6	1 according to Scott Van Hoff 11/12/20, single-family home	0	1
Umatilla Reservation	None	12/27/10	28 (4 non-res)	no	$1,209	14	1 according to Scott Van Hoff 11/12/20; residential condo	0	4
Totals			298 (273 residential and 25 non-residential)	Stanfield is the only one		94	2 according to Scott Van Hoff 11/12/20	0 according to Scott Van Hoff 11/12/20	

Source: Jason Gately, DLCD Natural Hazards Planner, 4/1/20; Tricia Sears, DLDC Natural Hazards Planner, 1/8/21; Katherine Daniel, DLCD Natural Hazards Planner, 1/8/21 & 5/24/21; David Slaght, City of Echo City Administrator – Recorder, 4/2/20; Julie Chase, City of Pendleton, 4/2/20; Brandon Seitz, City of Umatilla Community Development Director, 4/3/20; Teri Bacus, Pilot Rock Recorder, 4/7/20; Scott Van Hoff, FEMA Region 10, Regional Flood Insurance Liaison, 11/12/20; FEMA, *Community Rating System Eligible Communities, Effective October 1, 2020*, https://www.fema.gov/sites/default/files/2020-08/fema_crs_eligible-communities_oct-2020.pdf, 1/7/21; Celinda Adair, DLCD, NFIP Coordinator, 5/12/21; Patty Perry, Senior Planner, CTUIR, 5/12/21; Bob Waldher, Planning Director, Umatilla County, 5/18/21; Sheila Jasperson, City Recorder, Weston, 5/18/21;

Hazard Risk Analysis

The Umatilla County NHMP Steering Committee completed a Hazard Vulnerability Assessment/Analysis (HVA) during this NHMP update. This was described in Section 2 Risk Assessment. The method used for the HVA was developed from a Federal Emergency Management Agency (FEMA) tool that has been refined by the Oregon Office of Emergency Management (OEM). It addresses and weights (shown as percent within parentheses) probability (29%), vulnerability (21%), maximum threat (42%) and the history (8%) of each natural hazard and attributes a final hazard analysis score. The methodology produces scores that range from 24 to 240.

For local governments, conducting the HVA is a useful step in planning for hazard mitigation. The method provides the jurisdiction with a relative ranking from which to prioritize mitigation actions, but does not predict the occurrence of a particular hazard.

In the *2014 Umatilla County NHMP*, floods were ranked in third place out of the nine natural hazards. Five of the hazards had no score. In the *2021 Umatilla County NHMP*, floods are ranked in first place, with 240/240 points. There are nine hazards (removed weather emergencies and added air quality) in the *2021 Umatilla County NHMP*.

For more information on all the risk scores and ranks of the natural hazards, see Volume I Basic Plan, Section 2 Risk Assessment of this NHMP.

Probability Assessment

The probability of an occurrence has been assessed by FEMA and is displayed on the Federal Insurance Rate Maps (FIRM). FEMA has mapped the 10, 50, 100, and 500-year floodplains. This corresponds to a 10%, 2%, 1% and 0.2% chance of a certain magnitude flood in any given year. In addition, FEMA has mapped the 100-year floodplain (i.e., 1% flood) in the incorporated cities. The 100-year flood is the benchmark upon which the National Flood Insurance Program (NFIP) is based.

Vulnerability Assessment

One limiting factor to sound development in an area is the lack of accurate floodplain maps, an issue that has larger ramifications for development. The Umatilla County Flood Insurance Rate Maps (FIRMs) are dated September 3, 2010. The Flood Insurance Study has been completed for the FIRMs that became effective September 3, 2010. The FIS brought together all of the County and incorporated cities and the Confederated Tribes of the Umatilla Reservation (CTUIR). Umatilla County's website includes a list of the Letter of Map Changes (LOMC) issued. These documents will modify the FIRM Panels and will affect flood insurance for the parcels involved. Therefore, the documents are important to keep track of and on file in case there is any question as to the status of flooding on the affected parcel(s).[27]

According to the NHMP Steering Committee, areas that are most vulnerable to flooding events are Pendleton, Ukiah, Umatilla, Milton-Freewater, Echo, and the unincorporated areas of Umatilla County.

[27] Umatilla County, the *National Floodplain Insurance Program (NFIP)*, http://www.co.umatilla.or.us/planning/floodhazard.htm, accessed 1/7/21

Dams and levees are another potential source of flooding if they break. The Oregon Water and Resources Department (OWRD) has updated their website to more clearly describe that it only includes dams regulated by the State. The database no longer includes Corps of Engineers, Bureau of Reclamation, or hydropower dams regulated by FERC. To provide a more comprehensive identification of the dams in Umatilla County, the OWRD staff recommends the use of the National Inventory of Dams (NID).[28] Information in Table FL-6 is from the NID.

A little background on the NID is provided here as a framework for Table FL-6.

> "Congress first authorized the U.S. Army Corps of Engineers (USACE) to inventory dams in the United States with the National Dam Inspection Act (Public Law 92-367) of 1972. The NID was first published in 1975, with a few updates as resources permitted over the next ten years. The Water Resources Development Act of 1986 (P.L. 99-662) authorized USACE to maintain and periodically publish an updated NID, with re-authorization and a dedicated funding source provided under the Water Resources Development Act of 1996 (P.L. 104-3). USACE also began close collaboration with the Federal Emergency Management Agency (FEMA) and state regulatory offices to obtain more accurate and complete information. The National Dam Safety and Security Act of 2002 (P.L. 107-310) and the Dam Safety Act of 2006 reauthorized the National Dam Safety Program and included the maintenance and update of the NID by USACE. More recently, the NID was reauthorized as part of the Water Resources Reform and Development Act of 2014 and the Water Resources Development Act of 2018."[29]

It is important to recognize the NID consists of dams meeting at least one of the following criteria;

1) High hazard potential classification - loss of human life is likely if the dam fails,
2) Significant hazard potential classification - no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns,
3) Equal or exceed 25 feet in height and exceed 15 acre-feet in storage,
4) Equal or exceed 50 acre-feet storage and exceed 6 feet in height.[30]

[28] Keith Mills, Oregon Water Resources Department, personal communication, 3/30/21

[29] U.S. Army Corps of Engineers, Welcome, NID - Welcome (army.mil), accessed 3/31/21

[30] U.S. Army Corps of Engineers, Welcome, NID - Welcome (army.mil), accessed 3/31/21

Table FL-6 Umatilla County Dam Inventory

Dam Name	River	Owner
Langdon Lake Dam	Lookingglass	Langdon Lake Association, Pendleton, 97801
Three Mile Falls Diversion	Umatilla River	Reclamation
Cold Springs	Umatilla River	Reclamation
Indian Lake	Jennings Creek	BIA
McNary Lock and Dam	Columbia River	CENWW
Walchi Reservoir	Columbia River, Trib to	Starvation Farms, LLC
Weston EDA WWT Lagoon	Industrial Waste	Smith Frozen Foods/ City of Weston
Milton-Freewater Lagoon N-3	Unnamed Trib/ Walla Walla River	City of Milton-Freewater
Simplot Hermiston #2 (Lagoon)	Off Channel	JR Simplot Company
Simplot Waste Lagoon #1	Off Channel	JR Simplot Company Food Division
Meacham Lake Dam	Beaver Creek, Trib/ Meacham Creek	Cunningham Sheep Company
McKay	McKay Creek	Reclamation

Source: U.S. Army Corps of Engineers, Public Downloads, Oregon, Downloads (Public) (army.mil), accessed 3/31/21

The ORWRD website lists nine dams in Umatilla County that are regulated by the State of Oregon. The dams are categorized in hazard level or potential: High, Significant, and Low. Of the nine dams listed, there are no High hazard dams, two Significant, and seven Low level hazard dams.[31] High hazard dams are inspected annually.[32] All high hazard dams are required to have an Emergency Action Plan.[33]

There are multiple levees that serve as an important piece of physical infrastructure, providing flood control in areas of Umatilla County. Three of the largest levee systems are managed by the Milton-Freewater Water Control District on the Walla Walla River, Umatilla River Water Control District, and the Riverside-Mission Water Control District located along the Umatilla River. Although the levee control districts are not listed as participants in the planning process for the NHMP, they could serve as important partners for the proposed mitigation actions, especially those related to flooding. In addition to the levees managed by special districts, there are also numerous private levee systems located along rivers in Umatilla County. Appendix B Community Profile has additional information about dams and levees.

[31] Oregon Water Resources Department, OWRD Dam Inventory Query, http://apps.wrd.state.or.us/apps/misc/dam_inventory/, accessed 1/21/21. Additional information provided by Keith Mills, OWRD, personal communication, 3/30/21. Additional information about the location of Meacham Lake Dam provided by Tracy Hamby, Bank of Eastern Oregon, personal communication via Susan Christiansen, Greater Eastern Oregon Development Corporation, 3/30/21 and Megan Green, Umatilla County, personal communication, 3/30/21.

[32] Arden Babb, Oregon Water Resources Department, personal communication, 2/10/20

[33] Oregon Water Resources Department, *Dam Safety Program*, accessed 2/10/20

What is susceptible to damage during a hazard event?

The extent of the damage and risk to people caused by flood events is primarily dependent on the depth and velocity of floodwaters. Fast moving floodwaters can wash buildings off their foundations and sweep vehicles downstream. Roads, bridges, other infrastructure, and lifelines (pipelines, utility, water, sewer, communications systems, etc.) can be seriously damaged when high water combines with flood debris, mud and ice. Extensive flood damage to residences and other structures can result in basement flooding and landslide damage related to soil saturation. Surface water entering into crawlspaces, basements, and daylight basements is common during flood events not only in or near flooded areas but also on hillsides and other areas far removed from floodplains. Most damage is caused by water saturating materials susceptible to loss (e.g., wood, insulation, wallboard, fabric, furnishings, floor coverings and appliances). If not properly protected from the entry of floodwaters, mechanical, electrical and similar equipment can also be damaged or destroyed by flooding. Economic damage from floods can be substantial.

Community Flood Issues

Human Life

Protection of human life is of primary importance. This is paramount and is tied to several other community issues. Keeping homes safe from floodwaters will also help protect human life.

Critical /Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers

Recognizing the history of flooding in the region, and the location of the assets of critical/ essential facilities, critical infrastructure, and vulnerable population centers in the floodplain increases awareness of vulnerability to floods and other natural hazards. The critical/ essential facilities, critical infrastructure, and vulnerable population centers are described in detail in Section 2 Risk Assessment in Table 2-7 and have an “x” indicating which natural hazards may impact them.

Homes

Homes in frequently flooded areas can experience blocked sewer lines and damage to septic systems and drainfields. This is particularly the case of residences in rural flood prone areas who commonly utilize private individual sewage treatment systems. Inundation of these systems can result in the leakage of wastewater into surrounding areas creating the risk of serious water pollution and public health threats. This kind of damage can render homes unlivable.

Many older manufactured home parks are located in floodplain areas. Manufactured homes have a lower level of structural stability compared to traditional lumber-built homes. Manufactured homes in floodplain zones should be anchored to provide additional structural stability during flood events.

Businesses

Floods damage property and interrupt commerce. The economic losses due to business closures often total more than the initial property losses that result from floods. Direct damages from flooding are the most common impacts, but indirect damages, such as diminished clientele, can be just as debilitating to a business. Floods can cut off customer access and close businesses for repairs. A quick response to the needs of businesses affected by flood events can help a community maintain economic viability in the face of flood damage.

In addition, there are several historic structures that are susceptible to flooding events and if damaged, would negatively affect the tourist economy of the area.

Public Infrastructure Flood Issues

Public buildings such as libraries, schools and government buildings are of concern to the County due to their potential utility in the event of a flood. These buildings can be used as temporary locations for medical and emergency housing services.

Road systems are important to the local economy, and during hazard events, resilient road connections are critical for providing essential and emergency services. Roads are maintained by multiple jurisdictions. Federal, state, county, and city governments all have a stake in protecting roads from flood damage. Road networks in Umatilla County frequently cross floodplain and floodway areas.

Bridges

Bridges are key points of concern during flood events for two primary reasons:

- Bridges are often important links in road networks, crossing watercourses or other significant natural features.
- Bridges can be obstructions in the floodway, collecting debris and inhibiting the flow of water during flood events. This can cause water to back up and inundate areas upstream from the bridge that would not otherwise be affected. Also, this build-up of water can suddenly release, causing a flash flood of larger magnitude downstream.

Wastewater and Drinking Water Systems

Floods significantly impact drinking water and waste water systems. When sewer systems are inundated with floodwaters, raw sewage can be flushed into the waterways, posing a significant health hazard. Additionally, drinking water supplies can be contaminated with flushed wastewater or high levels of solids (eroded soil for example), and made unsafe for consumption. Both water and sewage systems often require significant repair and maintenance work following a flood.

Stormwater

Stormwater systems collect and concentrate rainwater and rapidly deliver it into the local waterway. This infusion of water causes increased flows downstream. During large rainstorms and floods, these systems are pushed past their capacity and stormwater begins flowing over-ground, causing other infrastructure damage. Traditional stormwater systems are a benefit to urban areas by quickly removing captured rainwater, however, they can be detrimental to areas downstream.

Other problems often develop where open ditches enter culverts or go underground into stormwater systems. An obstruction at these intersections causes overland water flow. The filling of ditches and swales near buildings can inhibit or prevent the flow of water can compound these problems. Inadequate maintenance, especially following leaf accumulation in the fall, can also contribute to the flood hazard in urban areas.

Parks and Open Space

Public parks and publicly owned open space can provide a buffer between flood hazards and private property. Wetlands in public ownership can reduce flood impacts by absorbing floodwaters and buffering water level fluctuations.

Power Supply

Flooding also significantly impacts electrical supply systems. Floodwaters short-out electrical lines and cause transformers to fail. Additionally, debris transported by floodwaters can knock down power poles and put live, high-voltage lines in the water, posing an electrocution hazard to people.

Communications/Phone Lines

Telephone and cable lines are similarly susceptible to floodwaters and floating debris. Underground lines are more resistant to flood damage, but often are exposed and damaged by swift currents.

Existing Hazard Mitigation Activities and Resources

There are numerous programs currently under way in Umatilla County designed to mitigate the impacts of flooding. These programs range from federally funded national programs to individual projects by landowners and projects by watershed councils and special districts.

Federal Programs

The National Flood Insurance Program (NFIP)

The NFIP is a federal program administered by the Federal Emergency Management Agency (FEMA). The function of the NFIP is to provide flood insurance to homes and businesses located in floodplains at a reasonable cost, and to encourage the location of new development away from the floodplain. The program maps flood risk areas, and requires local implementation to reduce the risk, primarily through restricting new development in floodplains. The Umatilla County Flood Insurance Rate Maps (FIRMs) are dated September 3, 2010. The Flood Insurance Study has been completed for the FIRMs that became effective September 3, 2010.[34]

Insurance is available to help recover from losses incurred from flooding events. As Table FL-5 indicates, there are 298 NFIP policies in Umatilla County. Also as mentioned previously, there are private flood insurance policies and it is noted that private insurance has become an increasingly popular option.

Flood insurance covers only the improved land, or the actual building structure. It is important to note that property located outside the SFHA may still be subject to severe flooding. FEMA reports that 25% to 30% of all flood insurance claims are from owners of property located in low to moderate-risk areas located outside of the SFHA.[35]

[34] Umatilla County, the *National Floodplain Insurance Program (NFIP)*, http://www.co.umatilla.or.us/planning/floodhazard.htm, accessed 1/7/21

[35] FEMA, National Flood Insurance Program: *Frequently Asked Questions, Repetitive Loss*, https://www.fema.gov/txt/rebuild/repetitive_loss_faqs.txt

Repetitive loss structures are defined as a NFIP - insured structure that has had at least two paid flood losses of more than $1,000 each in any 10-year period since 1978.[36] Repetitive loss structures are troublesome because they continue to expose lives and property to the flooding hazard. Local governments as well as the federal agencies, such as FEMA, attempt to address losses by encouraging and requiring floodplain insurance and funding projects such as acquiring land and improvements, relocating homes, or elevating structures. Continued repetitive loss claims from flood events lead to an increased amount of damage caused by floods, higher insurance rates, and contribute to the rising cost of taxpayer funded disaster relief for flood victims.

Community Rating System (CRS)

The Community Rating System (CRS) voluntary program recognizes and rewards efforts that go beyond the minimum standards of the NFIP. This recognition is in the form of reduced flood insurance premiums for communities that adopt such standards. CRS encourages voluntary community activities that reduce flood losses, facilitate accurate insurance rating, and promote flood insurance awareness. For CRS communities, flood insurance premium rates are discounted in increments of 5%; i.e., a Class 1 community would receive a 45% premium discount, while a Class 9 community would receive a 5% discount.[37] Table FL-7 illustrates how the CRS point system is broken down. The City of Stanfield is the only jurisdiction in this *2021 Umatilla County NHMP* that is participating in the CRS.

Table FL-7 Summary of Points and Insurance Rate Discounts Under CRS

Credit Points	Class	Premium Reductions
0-499	10	0%
500-999	9	5%
1000-1499	8	10%
1500-1999	7	15%
2000-2499	6	20%
2500-2999	5	25%
3000-3499	4	30%
3500-3999	3	35%
4000-4599	2	40%
4500+	1	45%

Source: FEMA, *National Flood Insurance Program*, http://www.fema.gov/national-flood-insurance-program, accessed December 27, 2018.

U.S. Army Corps of Engineers

In July of 2000 the United States Army Corps of Engineers (USACE) completed a document entitled *Report of Flood Fight Potential Sites in Umatilla County, Oregon*. The study was updated by USACE

[36] Ibid.

[37] Ibid.

on July 25, 2000. The original document and revisions were included as Appendix D in the *2014 Umatilla County NHMP*.[38] The study is not included in the 2021 Umatilla County NHMP.

The USACE flood fight study documents flood fight potential and potential mitigation opportunities in areas where USACE may be able to demonstrate economic justification. The study focused primarily on urban infrastructure such as hospitals, water treatment plants and other critical infrastructure as well as residential areas where benefits to more than one or two dwellings may be realized through flood fight and/or mitigation. Many of the mitigation recommendations in that report were included in the mitigation actions of the *2014 Umatilla County NHMP*.[39]

State Programs

State Natural Hazard Risk Assessment: Flood

The risk assessment in the *2020 Oregon Natural Hazards Mitigation Plan* provides an overview of flood risk in Oregon and identifies the most significant floods in Oregon's recorded history. It has overall state and regional information, and includes flood related mitigation actions for the entire state. https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_05b_RAState.pdf

Planning for Natural Hazards: Oregon Technical Resource Guide

This guide describes basic mitigation strategies and resources related to coastal hazards, floods, and other natural hazards, including examples from communities in Oregon.
https://scholarsbank.uoregon.edu/xmlui/handle/1794/1909

Statewide Planning Goals

There are 19 Statewide Planning Goals that guide land use in the State of Oregon. These became law via Senate Bill 100 in 1973.[40] One goal in particular focuses on land use planning and natural hazards. Goal 7 Areas Subject to Natural Disasters and Hazards,[41] requires local governments to identify hazards and adopt appropriate safeguards for land use and development. Goal 7 advocates the continuous incorporation of hazard information in local land use plans and policies. The jurisdictions participating in this *2021 Umatilla County NHMP* have approved comprehensive plans that include information pertinent to Goal 7.

https://www.oregon.gov/lcd/OP/Pages/Goals.aspx

ODOT

[38] *2014 Umatilla County NHMP*, May 2015

[39] Ibid.

[40] Oregon Department of Land Conservation and Development, https://www.oregon.gov/lcd/OP/Pages/History.aspx, accessed December 27, 2018.

[41] Oregon Department of Land Conservation and Development, https://www.oregon.gov/lcd/OP/Pages/Goals.aspx, accessed December 27, 2018.

ODOT has a Trip Check link on its website that provides information to help the public detour away from hazard areas during times of emergency. The Trip Check link also has road camera images to inform the public of road conditions prior to making a trip.

https://tripcheck.com/

Silver Jackets

The Silver Jackets program is a joint state-federal-local flood mitigation subcommittee, which is tied to a national USACE initiative. In Oregon, Silver Jackets provides a forum where DLCD, DOGAMI, OEM, USACE, FEMA, USGS, and additional federal, state and sometimes local and Tribal agencies can come together to collaboratively plan and implement flood mitigation, optimizing multi-agency utilization of federal assistance by leveraging state/ local/ Tribal resources, including data/ information, talent and funding, and preventing duplication among agencies.

The State of Oregon established Silver Jackets as a subcommittee to the Interagency Hazard Mitigation Team (IHMT), with the primary intents of strengthening interagency relationships and cooperation, optimizing resources, and improving risk communication and messaging.

The Oregon Silver Jackets act as acatalyst in developing comprehensive and sustainable solutions to state flood hazard challenges. Objectives of this IHMT subcommittee include:

- Facilitate strategic life-cycle flood risk reduction,
- Create or supplement a continuous mechanism to collaboratively solve state-prioritized issues and implement or recommend those solutions,
- Improve processes, identifying and resolving gaps and counteractive programs,
- Leverage and optimize resources,
- Improve and increase flood risk communication and present a unified interagency message, and
- Establish close relationships to facilitate integrated post-disaster recovery solutions.[42]

https://silverjackets.nfrmp.us/State-Teams/Oregon

County and City Programs

Zoning Ordinance – Floodplain Standards

Community participation in the NFIP requires the adoption and enforcement of a local floodplain management ordinance that controls development in the floodplain. Communities participating in the NFIP may adopt regulations that are more stringent than those contained in 44 CFR 60.3, but not less stringent.[43]

[42] Silver Jackets, *Oregon Silver Jackets*, https://silverjackets.nfrmp.us/State-Teams/Oregon.cfm, accessed December 11, 2019.

[43] FEMA, Region 10, *Floodplain Management: a Local Administrator's Guide to the National Flood Insurance Program*, https://www.fema.gov/media-library-data/20130726-1647-20490-1041/nfipguidebook_5edition_web.pdf

Checking the websites of each of the jurisdictions participating in this *2021 Umatilla County NHMP* provides the following:

- Umatilla County, this link is specific to flood hazards, http://www.co.umatilla.or.us/planning/floodhazard.htm
- Adams, http://www.cityofadamsoregon.com/
- Athena, https://www.cityofathena.com/
- Echo, https://echo-oregon.com/
- Helix, this link is on the Umatilla County website, http://www.co.umatilla.or.us/planning/city_info.html#Helix
- Hermiston, https://www.hermiston.or.us/commdev
- Milton-Freewater, https://www.mfcity.com/
- Pilot Rock, https://www.cityofpilotrock.org/
- Pendleton, https://pendleton.or.us/
- Stanfield, https://cityofstanfield.com/
- Ukiah, http://www.cityofukiahoregon.com/
- Umatilla, https://www.umatilla-city.org/
- Weston, http://www.cityofwestonoregon.com/

Floodplain Development and FEMA Maps

The flood maps are known as Flood Insurance Rate Maps (FIRM). To minimize damage to structures during flood events, jurisdictions require all new construction in the floodplain to get a floodplain development permit. The permit requires development to be anchored against movement by floodwaters, resistant to flood forces, constructed with flood resistant materials, and flood-proofed or elevated so that the first floor of living space, as well as all mechanical and services, is at least one foot above the elevation of the 100-year flood. These standards apply to new structures and to substantial improvements of existing structures. Critical facilities are required to the extent possible to be outside of the SFHA. Other types of development within the floodplain, such as, grading, cut and fill, installation of riprap, and other bank stabilization techniques also require a floodplain development permit.[44]

Elevation Certificate Maintenance

Elevation certificates are administered by Planning Department at Umatilla County, and also at the City jurisdictions. The certificates are required for buildings constructed in the floodplain to demonstrate that the building is elevated adequately to protect it from flooding.

The elevation certificate is an important administrative tool of the NFIP. It is used to determine the proper flood insurance premium rate; it can be used to document elevation information necessary to ensure compliance with community floodplain management regulations; and it may be used to support a request for a Letter of Map Amendment (LOMA) or Letter of Map Revision based on fill (LOMR-F). Umatilla County has elevation certificates on file for many developed properties.

[44] FEMA, Region 10, *Floodplain Management: a Local Administrator's Guide to the National Flood Insurance Program*, https://www.fema.gov/media-library-data/20130726-1647-20490-1041/nfipguidebook_5edition_web.pdf

Umatilla County Flood Mitigation Plan

After county wide flood events occurred in 1996/1997 Umatilla County was awarded a HUD grant to complete flood mitigation and outreach plan (Flood Plan). The plan was completed in August of 1997, but many of the identified action items were never pursued or funded. Some modest flood mitigation projects were implemented along Mill Creek in the northeast region of the county.[45]

In 2010, the Army Corps of Engineers decertified the flood control levee on the Walla Walla River in the Milton-Freewater area. As a result of the decertification, FEMA remapped the area which resulted in a large portion of the City of Milton Freewater being added to the 100 year floodplain. A local effort of city, county, state and federal agencies and numerous individuals convened to remedy the structural problems with the levee and then to file with FEMA to recertify the levee. A CLOMR was filed and approved in 2013. The approved CLOMR removed most of Milton-Freewater and several properties in unincorporated Umatilla County from the Special Flood Hazard Area. Additionally, there were some properties that remain or were added to the Special Flood Hazard Area because of the in-depth study. The new Flood Insurance Rate Maps for the Milton-Freewater area became effective on September 20, 2013.[46]

In the *2014 Umatilla County NHMP*, the Flood Plan was included as Appendix C and was co-adopted as part of the NHMP.[47]

Umatilla County Comprehensive Plan and Development Code

The Umatilla County Comprehensive Plan and Development Code implement the policies and laws of the National Flood Insurance Rate Program (NFIP). Chapter 152.351 of the Umatilla County Development Code implements a Flood Hazard (FH) Overlay Zone which limits development within the floodplain and floodway and regulates permitted development based upon NFIP design standards. All parcels within the mapped 100-year floodplain of Umatilla County are regulated by the FH Overlay Zone.[48]

In 2010, FEMA issued new Flood Insurance Rate Maps (FIRM) maps for the entire County. Umatilla County adopted the maps, which became effective September 3, 2010. The approval of the CLOMR along the Walla Walla River updated several Flood Insurance Rate Maps (FIRM) with an effective date of September 20, 2013. Additionally, in order to comply with new FEMA regulations, Umatilla County updated the Development Code to implement new mandatory regulations of the NFIP. The Code provisions became effective August 3, 2010.[49]

NOAA NWS and Umatilla County Emergency Management

The National Weather Service (NOAA NWS) has the ability to predict severe weather events that may trigger prolonged or flash flood events. NOAA NWS is able to issue notices to response agencies

[45] *2014 Umatilla County NHMP*, May 2015

[46] Ibid.

[47] *2014 Umatilla County NHMP*, May 2015

[48] *2014 Umatilla County NHMP*, May 2015

[49] *2014 Umatilla County NHMP*, May 2015

and to the public via television, radio, internet and Weather Radios (formerly Tone Alert Radios) when the potential for flooding is likely.[50]

Umatilla County Emergency Management (UCEM) coordinates with NOAA NWS when notices may be required to inform response agencies and the general public of potential flooding events. UCEM response and coordination is outlined in the Umatilla County *Emergency Operations Plan* and usually involves disseminating materials addressing shelter locations, sand bag locations, response contact information and flood fight information. Should a flood event become severe, UCEM is can activate the Emergency Operations Center (EOC) and Joint Information Center (JIC) to coordinate flood fights, emergency response, evacuation and the dissemination of important public safety information.[51]

The *Umatilla County EOP*, dated January 2012 (ordinance 2012-01 passed 1/18/12), is an all-hazard plan that describes how Umatilla County will organize and respond to emergencies and disasters in the community. It is based on, and is consistent with Federal, State of Oregon, and other applicable laws, regulations, plans, and policies, including the National Response Framework, and State of Oregon Emergency Operations Plan. The *Umatilla County EOP* is one component of the County's emergency management program and is designed to be compliant with the National Incident Management System.

The *Umatilla County EOP* consists of a Basic Plan, Emergency Support Function Annexes that complement the Federal and State Emergency Support Functions, Support Annexes, and Incident Annexes. It provides a framework for coordinated response and recovery activities during an emergency. It describes how agencies and organizations in Umatilla County will coordinate resources and activities with other Federal, State, local, tribal, and private-sector partners.[52]

Umatilla County Emergency Operations Plan, http://www.co.umatilla.or.us/bcc/codes/35.pdf

Future Changing Conditions/ Climate Change

In the *2021 Umatilla County NHMP*, there are several locations that describe future changing conditions or climate change as it relates to the natural hazards that impact Umatilla County and the cities. In the order of appearance in the NHMP: the Risk Assessment, the Hazards Annexes, and Appendix E contain this information. Within Appendix E there are two documents, the *Future Climate Projections: Umatilla County* and the *Climate Change Two-Page*r.

Flood Mitigation Actions

The flood mitigation actions have been identified by the Umatilla County NHMP Steering Committee which includes Umatilla County, the twelve incorporated cities, and four special districts. See Table

[50] *2014 Umatilla County NHMP*, May 2015

[51] *2014 Umatilla County NHMP*, May 2015

[52] Ecology and Environment, Inc., *Umatilla County Emergency Operations Plan*, January 2012.

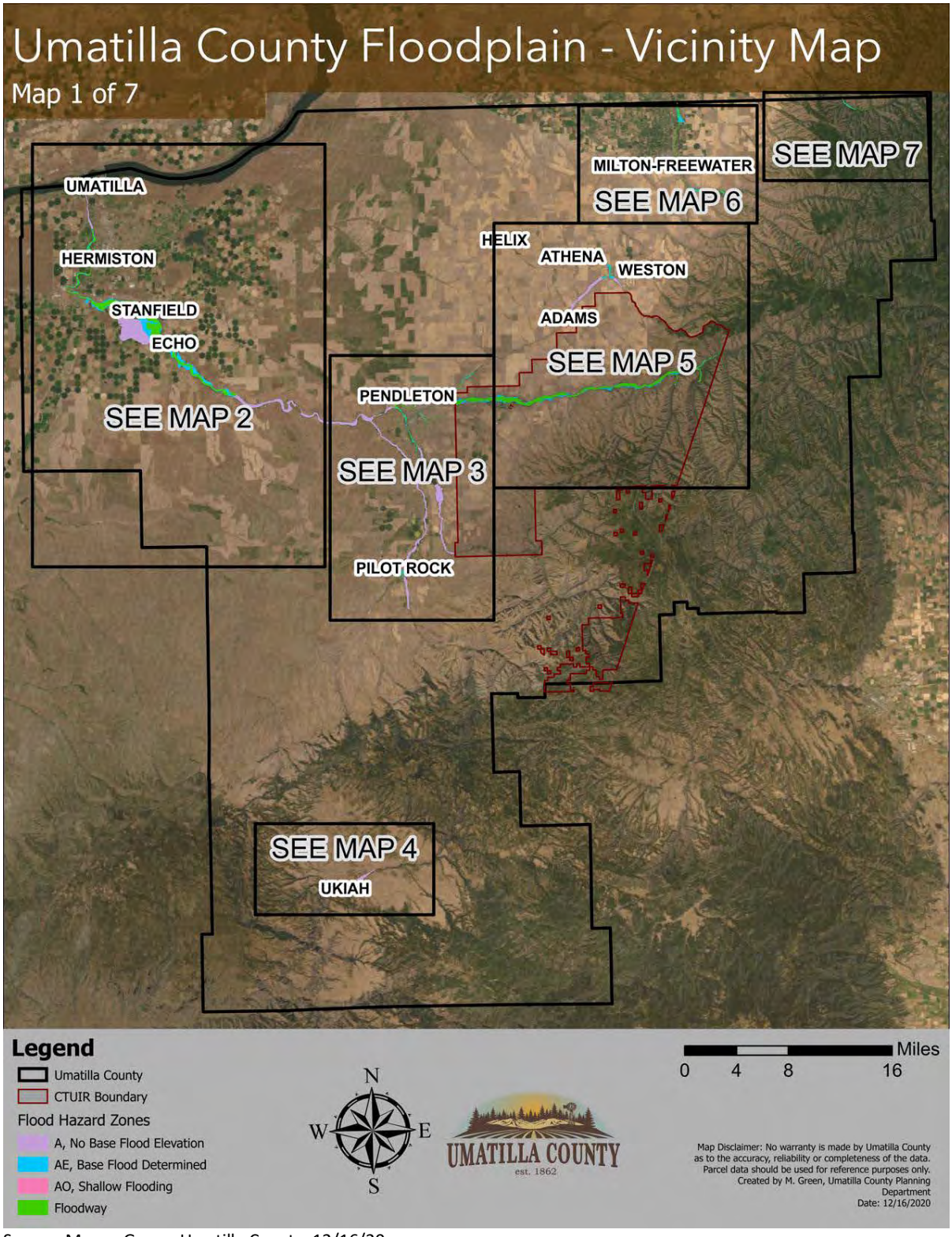
3-1, Umatilla County NHMP Mitigation Actions for a more detailed description of the mitigation actions in this NHMP.

In discussion with the NHMP Steering Committee, it was agreed that the risk level rankings from the HVA would be used as the way to prioritize the multi-hazard and hazard-specific mitigation actions. The risk level rankings are in Table 2-4 in Section 2 Risk Assessment.

In the *2021 Umatilla County NHMP*, there are 23 flood specific mitigation actions. The flood mitigation actions have a high priority because the HVA resulted in floods having a high risk level.

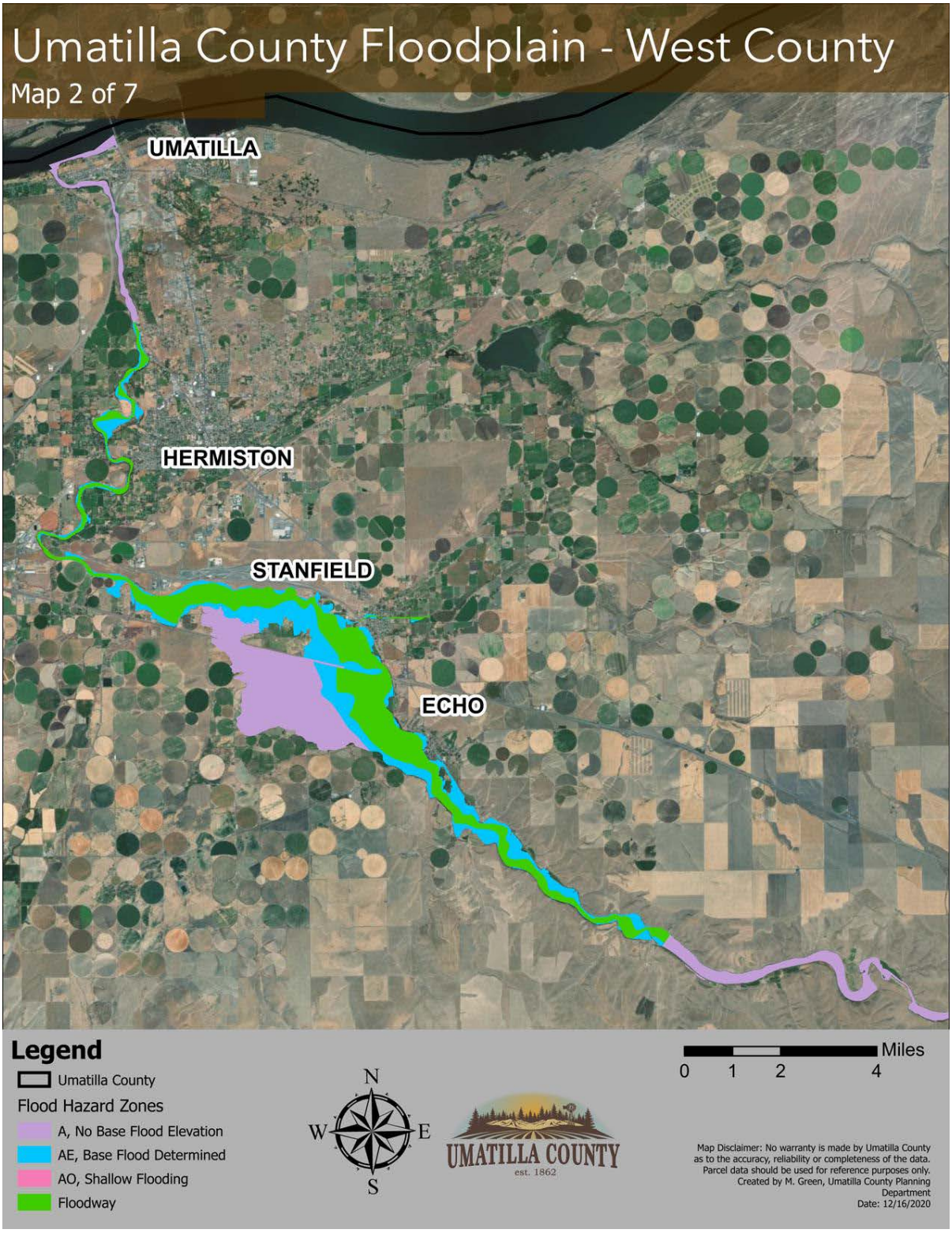
There are multi-hazard mitigation actions for the NHMP and those include flood related mitigation actions, in conjunction with the other hazards. The multi-hazard mitigation actions are a high priority.

Figure FL-4 Floodplain Map Vicinity



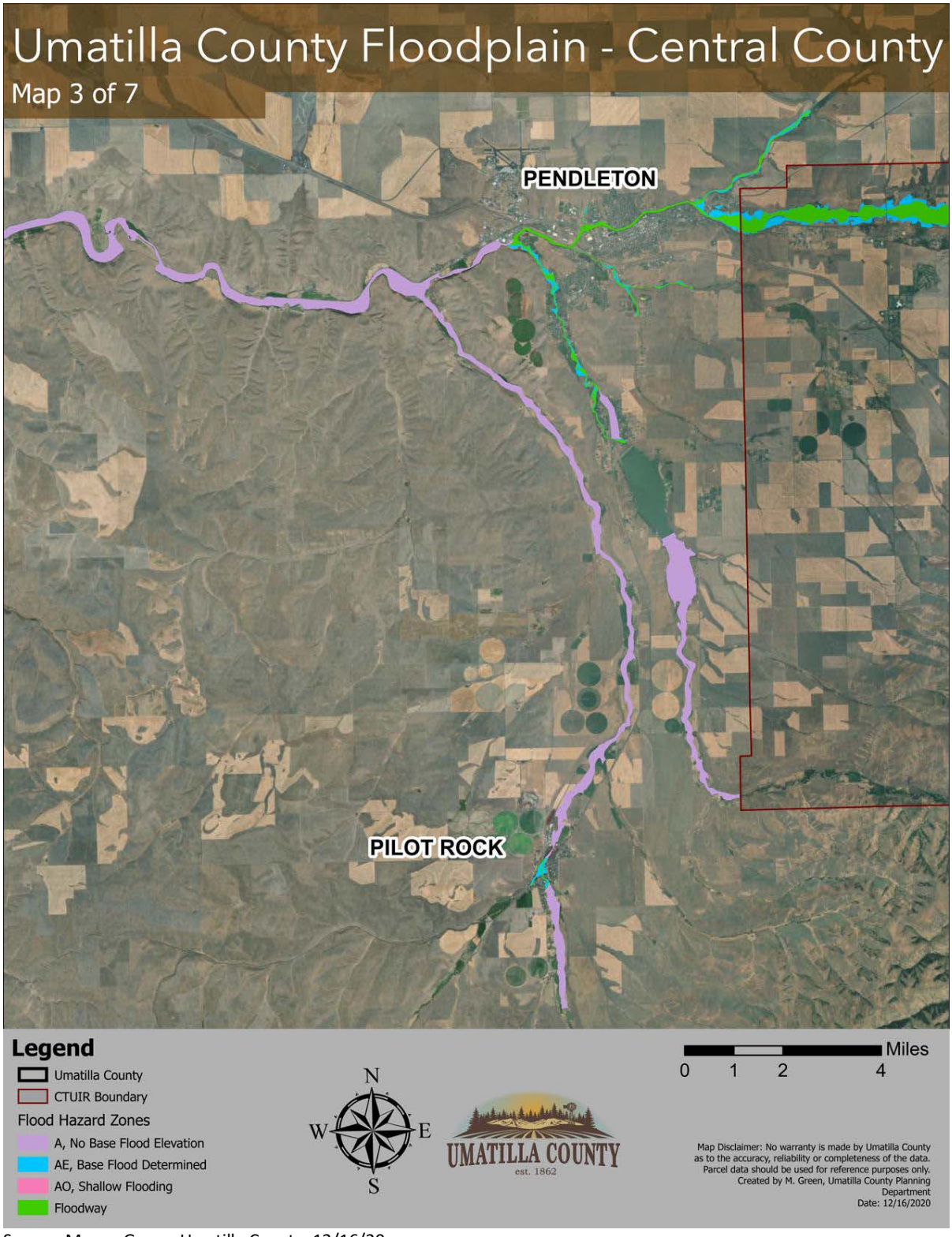
Source: Megan Green, Umatilla County, 12/16/20

Figure FL-5 Floodplain Map West County



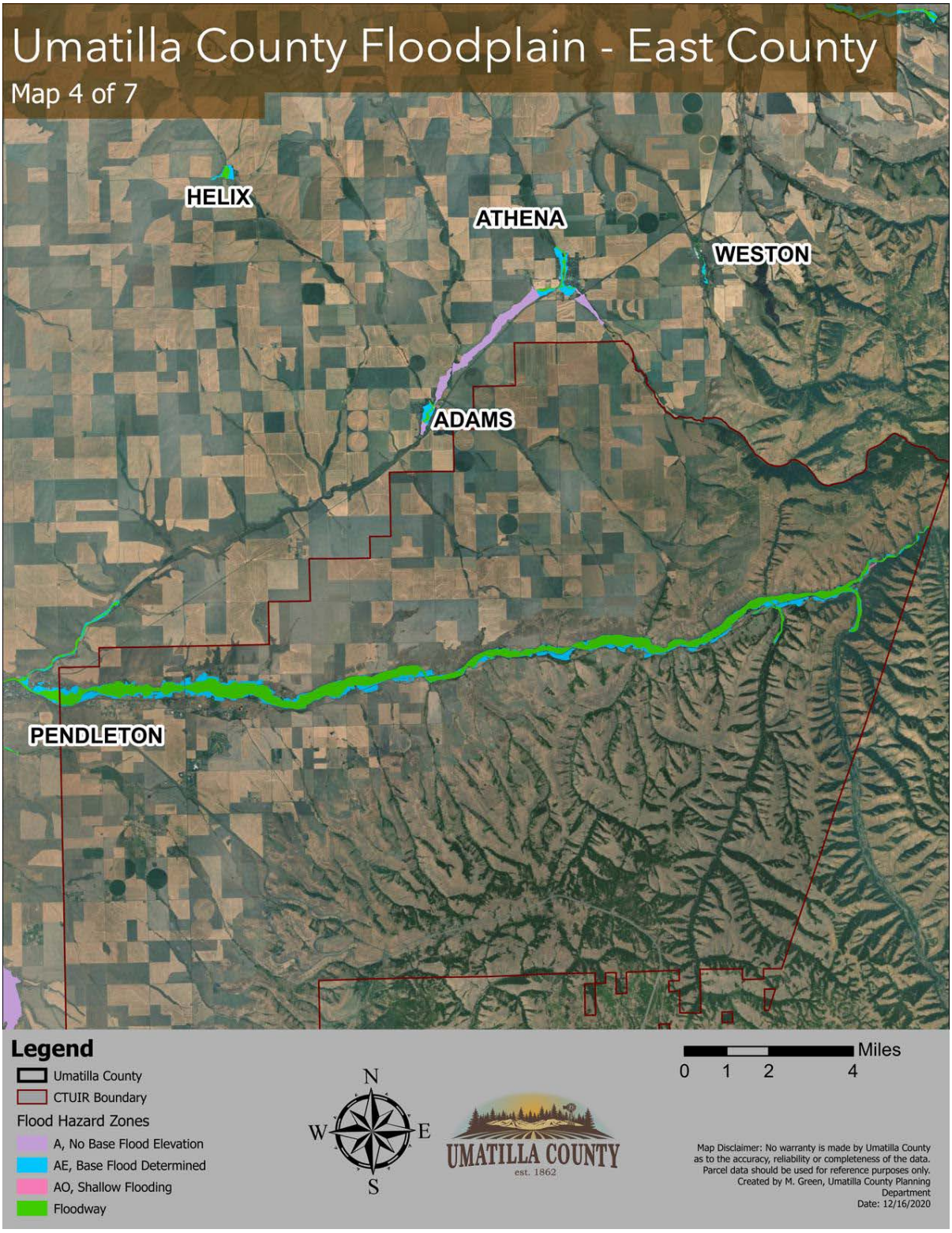
Source: Megan Green, Umatilla County, 12/16/20

Figure FL-6 Floodplain Map Central County



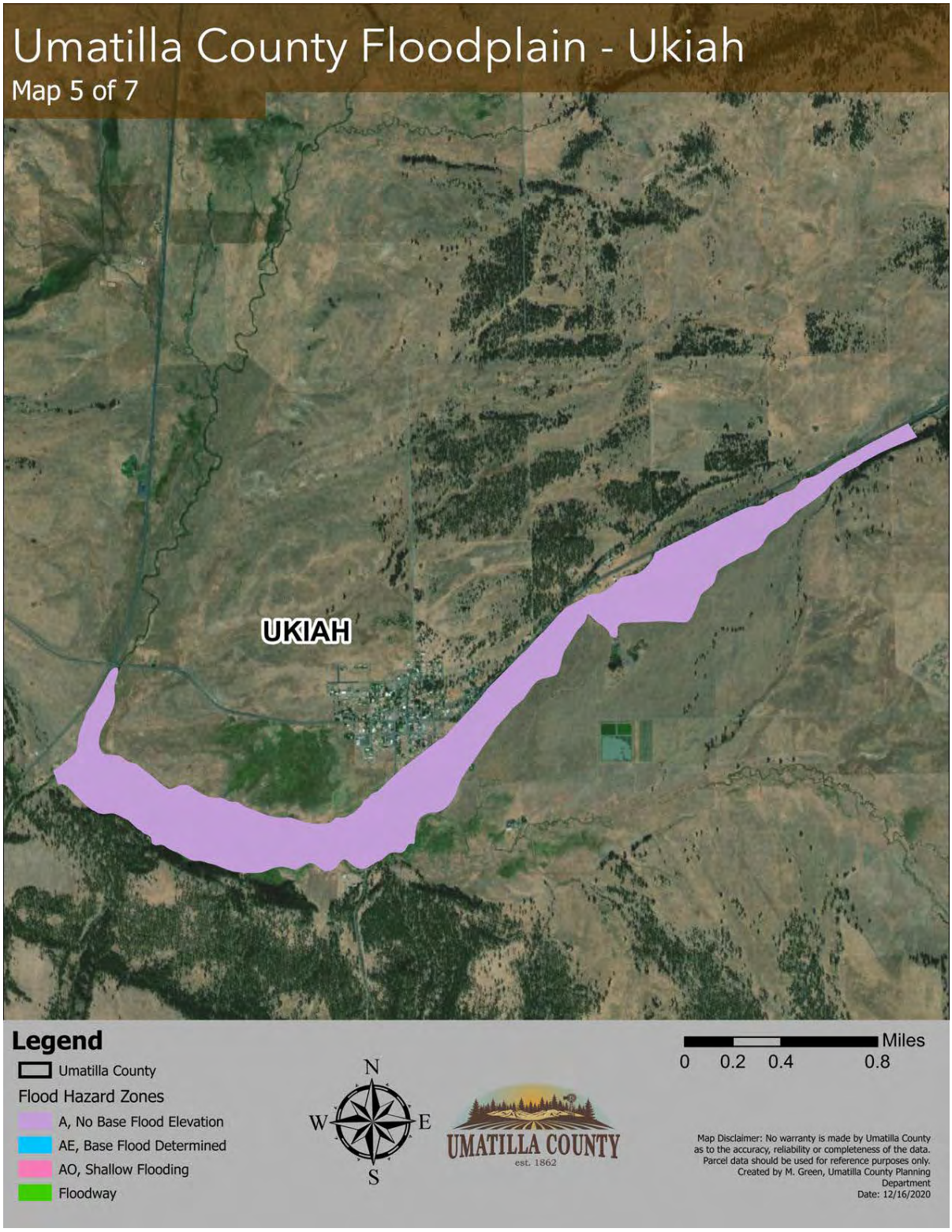
Source: Megan Green, Umatilla County, 12/16/20

Figure FL-7 Floodplain Map East County



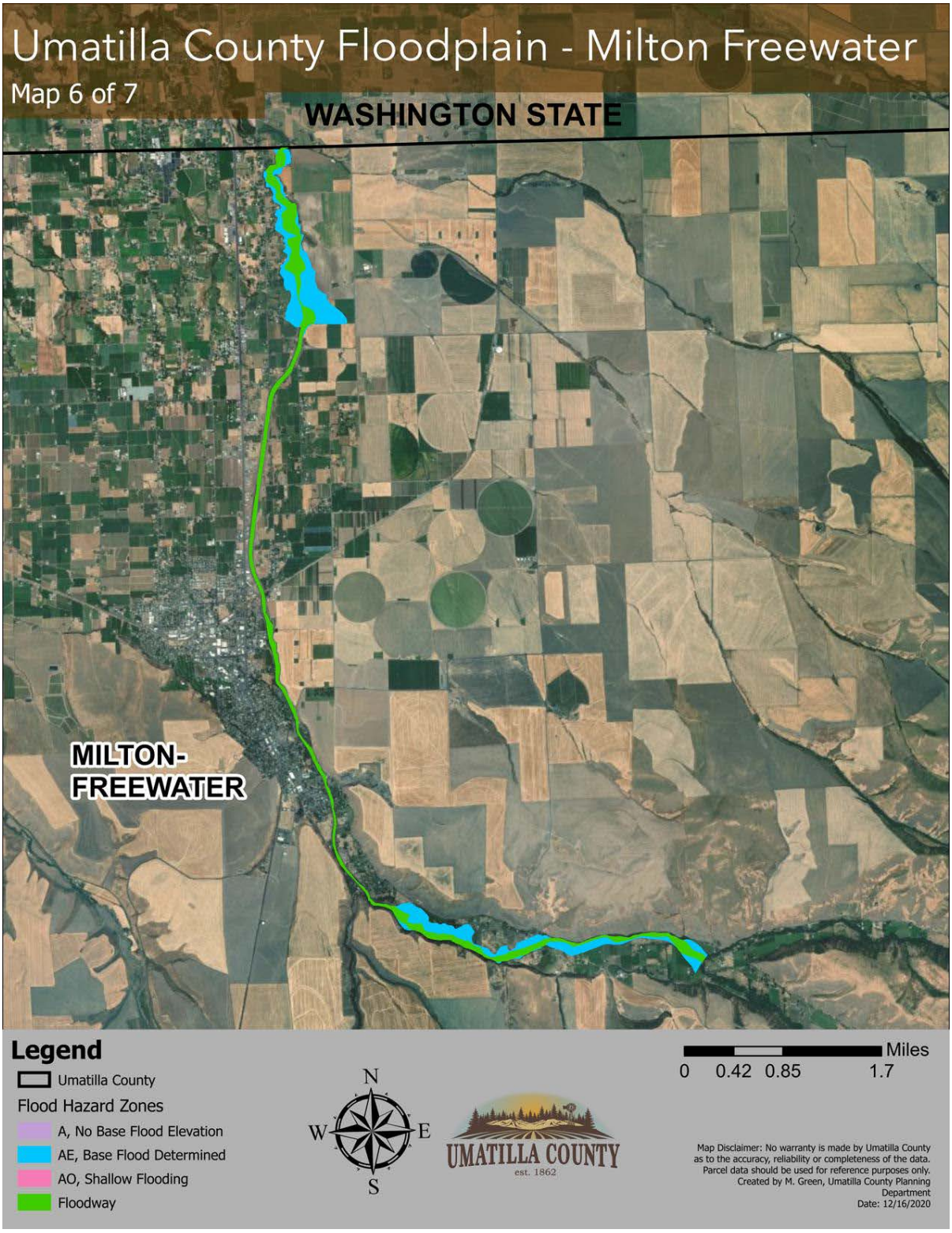
Source: Megan Green, Umatilla County, 12/16/20

Figure FL-8 Floodplain Map Ukiah



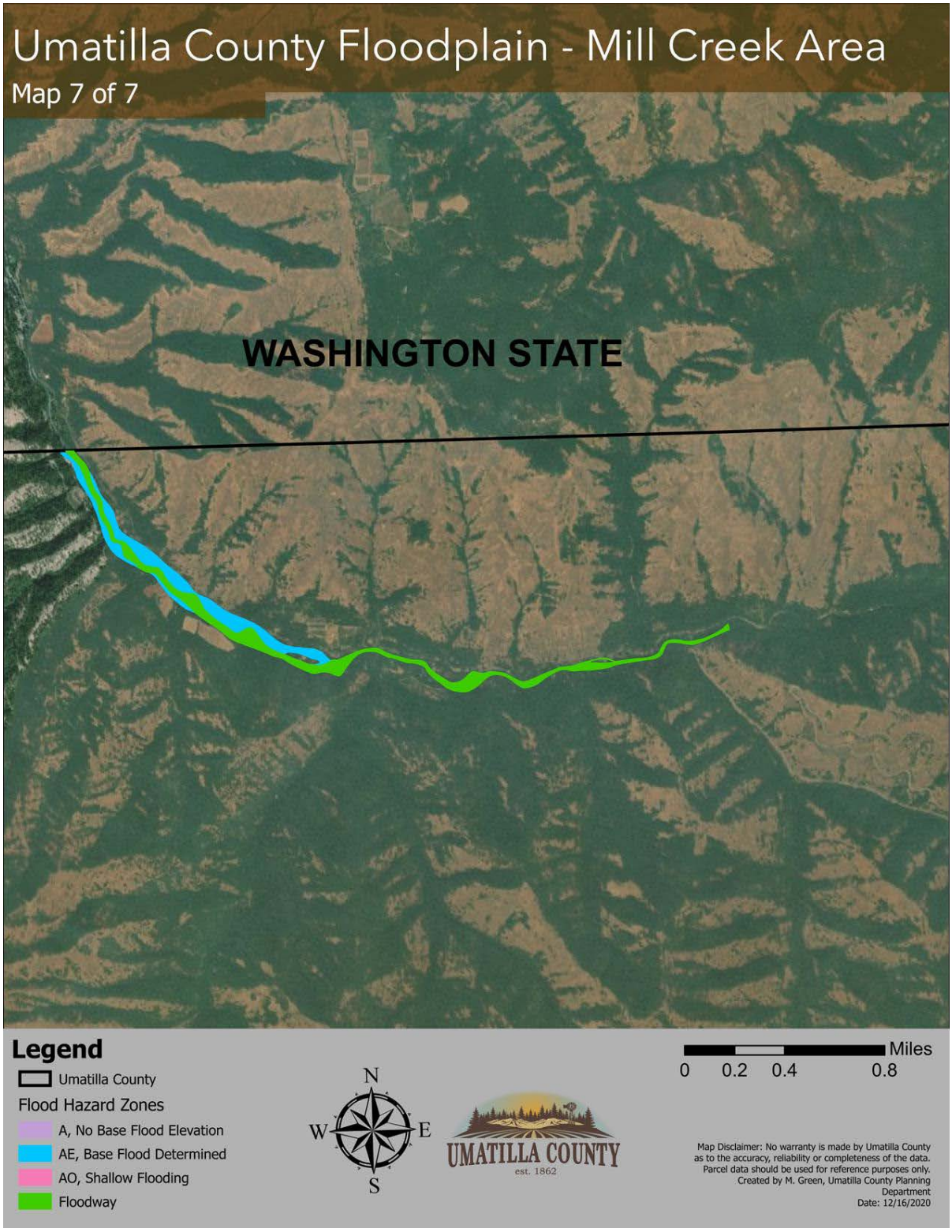
Source: Megan Green, Umatilla County, 12/16/20

Figure FL-9 Floodplain Map Milton-Freewater



Source: Megan Green, Umatilla County, 12/16/20

Figure FL-10 Floodplain Map Mill Creek



Source: Megan Green, Umatilla County, 12/16/20

AIR QUALITY HAZARD ANNEX

Risk Score: 224

Risk Level: High

Causes and Characteristics of Air Quality

The hazard of air quality was not a common one for inclusion in Natural Hazards Mitigation Plans, though as communities recognize the impacts of wood burning stoves, field burning, wildfires, and other factors that contribute to air quality, more communities are identifying air quality as a natural hazard in the NHMP. In this *2021 Umatilla County NHMP*, Umatilla County, the Cities, and the Special Districts recognize the unique situations that factor into identification of air quality as a natural hazard for the area.

In the *2014 Umatilla County NHMP*, air quality was not an identified natural hazard. In the *2021 Umatilla County NHMP*, air quality was added by the NHMP Steering Committee. In the Hazard Vulnerability Analysis, it ranked second out of the nine natural hazards (removed weather emergencies and added air quality).

During times of atmospheric temperature inversions and air stagnation, the temperature near the ground decreases rapidly toward sunset. As the surface air cools, it flows down the mountain slopes, forming a pool of cold air on the valley floor with the warmer air above acting as a lid. The cooling within this layer typically produces fog, and, as air pollutants are discharged, they become trapped. During stagnant conditions, the fog and trapped air can remain under this "lid" for several days, becoming increasingly polluted and unhealthy.

In terms of weather, Vincent Papol of the National Weather Service in Pendleton describes conditions in Umatilla County in winter and summer as follows:

Winter: At times and mostly between November and February, Umatilla County can experience cold air settling across the lower levels of the atmosphere while warm air remains aloft. This pattern can create an inversion that may trap air particles near the surface for extended periods of time affecting air quality. When this occurs, the National Weather Service may issue an Air Stagnation Advisory.[1]

Summer: During the summer months and mainly from June through August, a high-pressure system will remain in place over the Pacific Northwest for an extended period of time. When this occurs, airflow will be reduced resulting in the accumulation of air particles over the lower levels of the atmosphere affecting the air quality. In addition, smoke from surrounding fires could impact Umatilla County and affect the air quality prompting Air Stagnation Advisories.[2]

Air quality issues can occur widely across Umatilla County, affecting the unincorporated rural areas and the incorporated cities. There are many microclimates. Wildfires tend to provide a wide ranging source of smoke that can blanket large areas and be detrimental to health of people, animals, and

[1] Vincent Papol, National Weather Service – Pendleton, personal communication, 1/26/21

[2] Ibid.

plants. Wood burning stoves tend be a more concentrated, point source type of pollution that decreases air quality. Field burning is an agricultural technique that can contribute to air quality issues. Diesel emissions, often from vehicles on roads, also contribute to lower air quality. If a volcano were to erupt, ashfall could inundate the areas sufficiently to impact transportation and cause widespread health concerns.

See the Wildfire Hazard Annex for more information about wildfire impacts. In addition to wildfires, wood stoves, residential and agricultural burn days, and motor vehicle emissions continue to be a source of air (and other types of) pollution.

Federal Regulations

The Clean Air Act of 1970 and the U.S. Environmental Protection Agency (EPA) established health-based National Ambient Air Quality Standards (NAAQS) for six air pollutants: carbon monoxide (CO), particulate matter (PM_{10} and $PM_{2.5}$), ozone (O_3), sulfur dioxide (SO_2), nitrogen dioxide (NO_2) and lead (Pb). The areas that fail to meet the standards are designated “non-attainment” and are required to develop plans to come into compliance with the standards. Once compliance with the standard is achieved, a maintenance plan is developed to ensure that air quality will not be compromised in the future. Umatilla County is not an Air Quality Maintenance Area (AQMA).[3]

The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings. The Clean Air Act requires periodic review of the science upon which the standards are based and the standards themselves.[4]

Oregon Regulations

The Oregon Department of Environmental Quality (DEQ) is a regulatory agency with the responsibility to protect and enhance the quality of Oregon's environment. DEQ is responsible for providing accurate scientific data concerning the State of Oregon’s air quality “to ensure that the state meets the National Ambient Air Quality Standards (NAAQS) as required by the Federal Clean Air Act.” [5]

The Air Quality Index (AQI) provides a review of the health levels over the past year. The information in the *Oregon Air Quality Annual Report: 2020*, displays the AQI health levels over the past year for all the areas where DEQ and Lane County Regional Air Protection Authority (LRAPA) monitor air quality. The AQI is computed hourly for $PM_{2.5}$ in ug/$m^3$and ozone in parts per million (ppm). A rating of good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy, and hazardous are designated for the AQI number and that provides an air quality rating. EPA provides all states with

[3]Peter Brewer, DEQ, personal communication, 8/5/19.

[4]*Air Quality in Pendleton Documen*t, Greg Lacquement, personal communication, 2/4/21.

[5]DEQ, *Air quality home*, retrieved September 1, 2016 from http://www.oregon.gov/DEQ/aq/Pages/default.aspx.

the AQI equation for national uniformity. DEQ and Lane County Regional Air Protection Authority (LRAPA) report the AQI for cities in Oregon.[6]

Table AQ-1 Air Quality Index Ranges and Episode Stages

Air Quality Rating	Air Quality Index (AQI)	$PM_{2.5}$ 24-hour Average ($\mu g/m^3$)	Ozone 8-hour Average (ppm)
GOOD	0 - 50	0.0 - 12.0	0.000 - 0.054
MODERATE	51 - 100	12.1 - 35.4	0.055 - 0.070
UNHEALTHY FOR SENSITIVE GROUPS	101 - 150	35.5 - 55.4	0.071 - 0.085
UNHEALTHY	151 - 200	55.5 - 150.4	0.086 - 0.105
VERY UNHEALTHY	201 - 300	150.5 - 250.4	0.106 - 0.200
HAZARDOUS	>300	>250.5	>0.200

Source: DEQ, *Oregon Air Quality Annual Report: 2017,* https://www.oregon.gov/deq/FilterDocs/2017aqannualreport.pdf.

For 2020, the air pollutants of greatest concern in Oregon are[7]:

- Fine particulate matter (mostly from combustion sources) known as **$PM_{2.5}$** (2.5 micrometers and smaller diameter).
- **Air Toxics -** pollutants that cause or may cause cancer or other serious health effects.
- Ground-level **ozone**, a component of smog. This is moderately high, more into the lower elevation levels but could extend to Pendleton which is currently an unknown. It is currently not high enough in the Hermiston area to warrant more study, but the thinking is the O_3 plumes come more from the Tri-cities area in Washington.
- **Greenhouse gas** (GHG) emissions and global climate change are also concerns in Oregon. Oregon state agencies track GHG emissions from a wide variety of products, services, utilities, and fuel providers. These emissions data are available on DEQ's web site under Air Quality/ AQ Programs / Greenhouse Gas Reporting Home. This is an overall issue across all of Oregon but more considered in the higher population density areas.

[6] DEQ, *Oregon Air Quality Annual Report: 2020*, https://www.oregon.gov/deq/FilterDocs/AQmonitoringplan.pdf

[7] Peter Brewer, DEQ, personal communication, 3/11/21 and the *Oregon Air Quality Annual Report: 2017*, https://www.oregon.gov/deq/FilterDocs/2017aqannualreport.pdf.

Here is a summary of Oregon's 2017 - 2020 ambient air quality[8]:

- **$PM_{2.5}$** was greatly elevated in 2017 due to widespread wildfire smoke in August and September. The winter time levels were about average.
- **$PM_{2.5}$** in 2018: In 2018 air quality levels were much improved as primarily there were fewer wildfire impacts and the winter was milder, with more unstable air which moves wood stove smoke out of the area.
- **$PM_{2.5}$** in 2019: Little if any wildfire smoke impacted the Pendleton and Hermiston monitors as it was a very low fire season with the only major impact in the SW part of Oregon.
- **$PM_{2.5}$** in 2020: In 2020, however, wildfire smoke impacted the area greatly. All days with smoke levels higher than about 20 ug/m3 per day came for wildfires from different sources. Most all of the smoke travelled to Umatilla County from other areas yet impacted the local areas of Hermiston and Pendleton greatly. From 9/11/2020 to 9/19/2020 we saw elevated levels of smoke in the Pendleton area (indicative of the regional plume over that part of the state) initially doubling to 27.9 ug/m3 for one day then from 262 and up to 445 ug/m3 then slowly dropping to 106 ug/m3 over 8 days before back to normal levels of 12 ug/m3. This shows us that even though the County is not burning, the entire County can experience poor air quality for a period of time (8 days) with levels greatly over the recommended NAAQS. The elevated levels of smoke are shown in yellow highlight in Table AQ-2.

Table AQ-2 Pendleton Smoke Levels in September 2020 in Ug/m3

Date	Ug/m3 Smoke, Pendleton
9/11/20	27.9
9/12/20	261.9
9/13/20	444.7
9/14/20	394.8
9/15/20	305.3
9/16/20	233.1
9/17/20	184.9
9/18/20	165.3

Source: Peter Brewer, DEQ, personal communication, 3/11/21

- **Air Toxics** in 2017 and 2018: In 2017 and 2018, some of the **air toxics** such as benzene and acetaldehyde, remained near or above the health benchmarks. Air toxics in the wildfire smoke were greatly elevated in impacted areas. Health benchmarks are concentration levels at which, if exposed over a lifetime, an individual's risk of getting cancer is increased by one in a million, or non-cancer health effects could occur.
- **Air Toxics** in in 2019: In 2019 the air toxics were not elevated as conditions were not influenced by wildfire smoke.
- **Air Toxics** in 2020: In 2020 they were greatly elevated in mid- September in most areas of the state, including Umatilla County due to widespread fires to the west of the area.

- **Ozone** in 2017 and 2018: In 2017 and 2018, the **ozone** (smog) levels violated the National Ambient Air Quality Standard in most of the communities impacted by wildfire smoke because of ozone precursors in the smoke such as nitrogen dioxide and volatile organic

[8] Peter Brewer, DEQ, personal communication, 3/11/21 and the *Oregon Air Quality Annual Report: 2017*, https://www.oregon.gov/deq/FilterDocs/2017aqannualreport.pdf.

compounds. Actual ozone levels however are unknown due to not having the resources to locate a monitor in the area during the wildfire season. Ordinarily ozone levels are much lower than the National Ambient Air Quality Standard. Ozone in the Hermiston area is monitored and some years outside of the wildfire season it can be just under the standard. Most of this plume is considered to be brought into the area from the Tri-cities area in Washington other than from known wildfires in Oregon.

- **Ozone** in 2019 and 2020: In 2019 and 2020 outside of the wildfire season, ozone levels were below the health criteria, yet the monitor in Hermiston was overloaded and disconnected from the system one day into the 2020 fire season so data was not recorded. It is very likely ozone levels increased at this time yet we cannot claim how high.

- **Carbon monoxide, nitrogen dioxide, sulfur dioxide** and **PM_{10}** in 2017 and 2018: In 2017 and 2018, **carbon monoxide, nitrogen dioxide, sulfur dioxide** and **PM_{10}** are far below the criteria pollutant federal health standard. These pollutants have been trending mostly downward for most locations over the last ten years.
- **Carbon monoxide, nitrogen dioxide, sulfur dioxide** and **PM_{10}**: in 2020: For 2020, during the same wildfire data trend of 9/12 through 9/19 the elevation of PM10 would have been over the standard in a similar manner as the PM2.5 data.

- **Overall air quality** in 2019: In 2019, air quality was improved all over Oregon due to weather patterns and very few wildfires.
- **Overall air quality in 2020:** In 2020, air quality was excellent due to reduced traffic and driving for the year other than during the severe wildfire impacts in September. The covid-19 virus had an impact on general pollutant levels as the air was somewhat cleaner yet overall very good quality for the year other than wildfire impacts.

Air Quality Pollutants

Oregon DEQ operates the ambient monitoring network for the entire state with the exception of Lane County which is operated by the Lane Regional Air Protection Authority (LRAPA). These air quality monitoring networks measure ambient concentrations of the criteria pollutants - ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, lead. The air quality pollutants are monitored at the locations shown on Figure AQ-1.[9] There are monitors in Hermiston and Pendleton. Pendleton is an annual monitoring site and Hermiston is a summer monitoring site.

[9] DEQ, 2019 *Oregon Annual Ambient Criteria Pollutant Air Monitoring Network Plan,* https://www.oregon.gov/deq/FilterDocs/AQmonitoringplan.pdf. Remains the same in the *2020 Plan*.

Figure AQ-1 Oregon's 2020 Ambient Air Monitoring Network

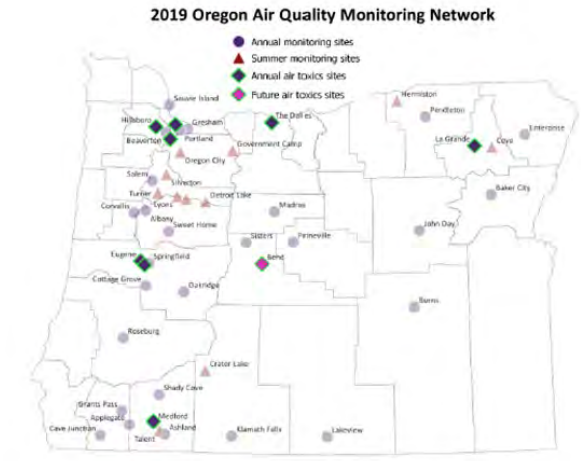


Figure 1. ODEQ and LRAPA Ambient Air Monitoring Network

Source: DEQ, 2019 *Oregon Annual Ambient Criteria Pollutant Air Monitoring Network Plan,* https://www.oregon.gov/deq/FilterDocs/AQmonitoringplan.pdf. Remains the same in the *2020 Plan*.

Within Appendix E there are two documents, the *Future Climate Projections: Umatilla County* and the *Umatilla County Future Climate Projections Two-Pager Flyer.* In the Executive Summary of the *Future Climate Projections* report there is a brief recap of each of the metrics examined. In this part of the *Future Climate Projections* report it states, "Under future climate change, the risk of wildfire smoke exposure is projected to increase in Umatilla County. The number of "smoke wave" days—days with high concentrations of wildfire-specific particulate matter—is projected to increase by 141% and the intensity of "smoke waves" is projected to increase by 82% by 2046–2051 under a medium emissions scenario compared with 2004–2009."[10] This could certainly have ramifications on the air quality in Umatilla County.

DEQ looks at air quality pollutant trends for Ozone, $PM_{2.5}$, PM_{10}, carbon monoxide, sulfur dioxide, nitrogen dioxide, air toxics, and greenhouse gases. Each of these trends is described below.

Ozone

DEQ describes that

> "Ozone is a secondary pollutant formed when there are elevated levels of nitrogen dioxide and volatile organic compounds that undergo chemical reactions in high temperatures, and sunlight. In Oregon, elevated ozone occurs in the summer and can be formed by human-caused pollution from fossil fuel combustion and also by naturally caused pollution from wildfire smoke, which contains NO_2 and VOCs. In 2017, most of the state experienced elevated ozone because the wildfire smoke introduced natural precursors on top of the human-caused emissions. With global warming we expect more fires in the Northwest and higher temperature days; this will result in more elevated ozone days."[11]

[10] OCCRI, *Future Climate Projections: Umatilla County*, October 2020, https://www.oregon.gov/lcd/CL/Documents/Umatilla_County_FutureClimateProjectionsReport_Oct2020.pdf

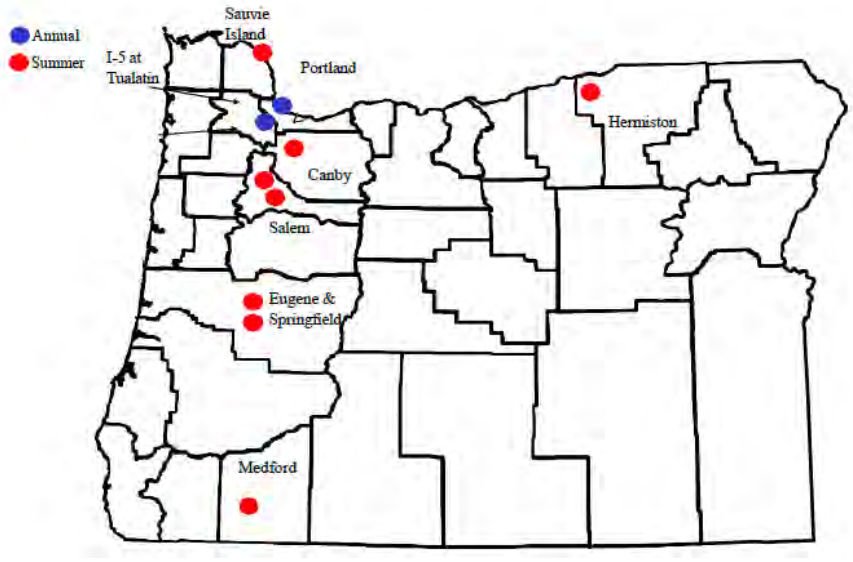
[11] DEQ, *Oregon Air Quality Annual Report: 2017,* https://www.oregon.gov/deq/FilterDocs/2017aqannualreport.pdf.

DEQ states that "data with wildfire contributions is included because it is very difficult to determine if the ozone would have exceeded the NAAQS without the smoke from wildfires."[12]

DEQ notes that the wildfire smoke in 2017 contributed to the elevated ozone levels most likely caused Portland to violate the NAAQS. However, DEQ also stated that since high ozone occurs in the summer months precisely when wildfire smoke impacts occur, it is very difficult to determine what the ozone level would have been but for the wildfire smoke.

In the *2020 Oregon Annual Ambient Criteria Pollutant Air Monitoring Network Plan* it describes that Oregon DEQ and LRAPA have 10 monitoring sites for ozone: four in the Portland-Metro area (Southwest Clean Air Agency also has an additional one in Vancouver), two in Salem, two in Eugene-Springfield, one in the Medford-Ashland area, and one in Hermiston. A map of the Ozone Monitoring Network is shown below.

Figure AQ-2 Oregon's Ozone Monitoring Network



Source: DEQ, *2020 Oregon Annual Ambient Criteria Pollutant Air Monitoring Network Plan*

$PM_{2.5}$

Fine particulate matter ($PM_{2.5}$) is a concern due to smoke impacts from woodstoves, fireplaces and other wood burning appliances besides wildfire smoke in the summer. Other sources of $PM_{2.5}$ include open burning, prescribed burning, wildfires, smoke from industrial stacks, and some road dust from vehicle travel.

Again, within Appendix E, the *Future Climate Projects* report states, "Wildfires are primarily responsible for days when air quality standards for $PM_{2.5}$ are exceeded in western Oregon and parts of eastern Oregon, although wood stove smoke and diesel emissions are also main contributors." The *Future Climate Projects* report further states that with the increasing wildfires and $PM_{2.5}$ levels, there is a greater risk of wildfire smoke exposure through increasing frequency, length, and intensity of smoke waves. Smoke waves are two or more consecutive days with high levels of $PM_{2.5}$ from wildfires. Measuring the number of smoke waves is one way to see the changes of the $PM_{2.5}$ levels.

[12] DEQ, *Oregon Air Quality Annual Report: 2017,* https://www.oregon.gov/deq/FilterDocs/2017aqannualreport.pdf.

In Umatilla County the frequency of "smoke wave" days is expected to more than double and the intensity—the concentration of particulate matter—of "smoke wave" days is expected to increase.[13]

DEQ describes that wildfire smoke impacts air quality, and that it is useful to understand how much wildfire smoke contributed to particulate levels above the NAAQS standard. DEQ also notes that it is useful to understand how particulate levels in an airshed compare to the NAAQS without the wildfire emissions, because this shows the effectiveness of local air quality improvement in communities with particulate reduction plans.

In Umatilla County, Pendleton is the city most prone to poor air quality conditions. "The main pollutant of concern in rural areas such as Pendleton is fine particulate matter. Fine particulate matter (PM) comes mostly from windblown dust and smoke from power plants, vehicle exhaust, and fuel combustion, such as wood stove smoke and open burning. There are harmful effects from breathing particles measuring less than 10 microns in diameter, known as PM_{10}. Most recent research indicates that even smaller particles, those measuring less than 2.5 microns in diameter (PM2.5) may be responsible for the most significant health effects, like premature mortality, hospital admissions, and respiratory illness. Fine particle air pollution in the size range of PM_{10} and $PM_{2.5}$ is of great concern because these particles can be inhaled deeply into the lungs where they enter the bloodstream or can remain for years. The health effects of particulate matter vary with the size, concentration, and chemical composition of the particles."[14]

PM_{10}

The PM_{10} trend chart shows the values in the city with the highest concentration, the average, concentration, and the lowest concentration. All cities are well below the standard, but EPA requires DEQ to continue monitoring in PM_{10} maintenance areas and in cities over 500,000 people.[15]

Carbon Monoxide, Sulfur Dioxide, Nitrogen Dioxide

The carbon monoxide, sulfur dioxide, and nitrogen dioxide trends for cities in Oregon as compared to the federal standards are measured. These are not a hazard concern for Umatilla County.

Air Toxics

Oregon DEQ and LRAPA began sampling for air toxics in Oregon in 1999. This section of the *Oregon Air Quality Annual Report: 2017* describes data for the toxics of concern: benzene, acetaldehyde, arsenic, cadmium, lead, and manganese. These are not a hazard concern for Umatilla County at this time. Also, the information is for neighborhood monitoring only; it does not include monitoring next to industrial facilities. That information is presented in separate reports issued by the Oregon Health Authority, specific to the monitoring project and facility.[16]

[13] OCCRI, *Future Climate Projections: Umatilla County,* October 2020, https://www.oregon.gov/lcd/CL/Documents/Umatilla_County_FutureClimateProjectionsReport_Oct2020.pdf

[14] *Air Quality in Pendleton Documen*t, Greg Lacquement, personal communication, 2/4/21.

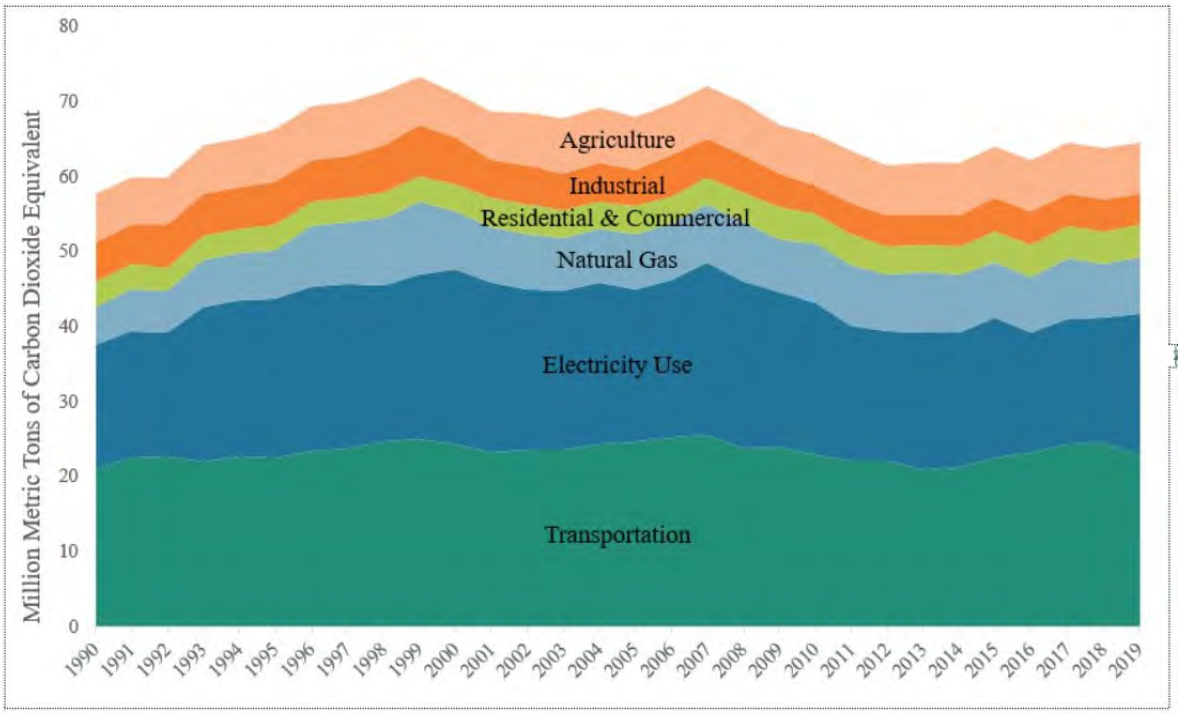
[15] DEQ, *Oregon Air Quality Annual Report: 2017,* https://www.oregon.gov/deq/FilterDocs/2017aqannualreport.pdf

[16] DEQ, *Oregon Air Quality Annual Report: 2017,* https://www.oregon.gov/deq/FilterDocs/2017aqannualreport.pdf

Greenhouse Gases

Information about greenhouse gas emissions in Oregon are presented on DEQ's website at https://www.oregon.gov/deq/aq/programs/Pages/GHG-Inventory.aspx. According to this page, "Oregon's sector-based inventory measures human-caused greenhouse gas emissions produced within Oregon by economic sector. It also includes the emissions associated with the electricity used in Oregon regardless of where that electricity is generated." [17] Figure AQ-3 shows Oregon's greenhouse gas emissions from 1990 through 2019. Emissions from transportation and electricity use are Oregon's largest sources of greenhouse gas emissions. Greenhouse gases and climate change have a relationship that is described in Appendix E.

Figure AQ-3 Oregon Greenhouse Gas Emissions 1990-2019



Source: DEQ, Oregon Greenhouse Gas Sector-Based Inventory Data, https://www.oregon.gov/deq/aq/programs/Pages/GHG-Inventory.aspx, accessed 2/26/21

History of Air Quality in Umatilla County

The Umatilla County NHMP Steering Committee recognized that wildfires and other sources can cause poor air quality and that people and animals can suffer detrimental impacts as a result. Wood stoves also contribute to poor air quality. They determined, after discussion at the September 29, 2020 Steering Committee meeting, that air quality should be a natural hazard for Umatilla County. A list of air quality events in Umatilla County is included in Table AQ-3.

[17] DEQ, *Oregon Greenhouse Gas Sector-Based Inventory Data*, https://www.oregon.gov/deq/aq/programs/Pages/GHG-Inventory.aspx, accessed 2/26/21

Table AQ-3 Significant Historic Air Quality Events

Date	Location	Description
1987	Nationwide	In 1987 the national PM_{10} levels were revised to a 24-hour concentration of 150 ug/m3 and an annual concentration of 50 ug/m3.
1991	Pendleton	The Pendleton Air Quality Commission (AQC) was established in January of 1991 to address air quality issues in Pendleton.
1996	Nationwide	In 1996 the national $PM_{2.5}$ 24-hour NAAQS was established at 65 ug/m3, and the annual average NAAQS set at 15 ug/m3. The daily standard is measured by the 98% of official monitoring data collected per year, and averaged over a 3-yr rolling period.
1999	Pendleton	Survey showed 800 woodstoves in Pendleton which was a major cause of particulate matter.
2000	Pendleton	The Wood Stove Replacement Loan Program is started in Pendleton under City Ordinance 3630. The loan limit is $3,000 per household. Pendleton Sanitary Services agreed to accept, destroy, and recycle old stoves.
2004	Pendleton	Ordinance 3708 approved by the City of Pendleton. It provided upt o $300,000 in loan funds and increased the loan limit to $3,500 per household.
1999	Umatilla County	Umatilla County Ordinance 95.10 adopted. Umatilla County Smoke Management Program and the Smoke Management Committee are established.
2006	Nationwide	In 2006 the national $PM_{2.5}$ 24-hour standard was set at 35 ug/m3. The PM_{10} 24-hour standard was set at 150 ug/m3 with 1 expected exceedance.
2008	Pendleton	The 7th Grade Air Quality Education program is started at Sunridge Middle School in Pendleton.
2008	Pendleton	Ordinance 3766 “Regulating Burning for the Reduction of Air Pollution, Protecting the Health of the City of Pendleton” was approved. It established the Air Quality Daily Burn Forecasts, which established burning rules and restrictions. It also stated the purpose of the Air Quality Commission is “to evaluate relevant air quality data, identify significant contributing emission sources, educate the public on air quality issues, and recommend appropriate emission reduction strategies to the Pendleton City Council.”
2012	Nationwide	In 2012 the national $PM_{2.5}$ annual average NAAQS was reduced to 12 ug/m3. The PM_{10} annual average was revoked.
2013	Umatilla County	Umatilla County Smoke Management Program Operating Plan adopted 4/17/13. The Operating Plan serves as the official guide to implementing the Smoke Management Program.
2016	Pendleton	Ordinance 3895 “An Ordinance Amending Ordinance No. 3708 Establishing a Wood Stove Replacement Program, Authorizing Loans to Property Owners, Setting up Procedure for Liens Against Real Property, And Establishes Geographic Eligibility Boundaries” was approved by the City of Pendleton.
2016	Pendleton	Air Quality Education program started at Sherwood Heights Elementary School in Pendleton.
2017	Pendleton	Over $535,000 in loans have been made and 191 wood stoves replaced in Pendleton.
2017/2018	Pendleton	The City of Pendleton’s air quality has met DEQ/EPA mandated particulate (PM2.5 and PM10.0) attainment levels.
2018	Pendleton	Had 3 WSRLP participants in 2018 with a total of $9,359 loaned in Pendleton.
2019	Pendleton	Air Quality Education program started at McKay Elementary School in Pendleton.
2020	Pendleton	Air Quality Education program started at Washington Elementary School in Pendleton.
2021	Pendleton	As of 2/18/21, in Pendleton, there have been 194 wood stoves and inserts replaced with new EPA certified heating systems. There are five purple air monitors installed within the City of Pendleton and one awaiting installation. There is an electronic reader board that provides air quality, burning, and fire safety information.

Source: Peter Brewer, DEQ, personal communication, 8/30/19 and 1/6/20; Air Quality in Pendleton Document, Greg Lacquement, City of Pendleton, personal communication, 2/4/21; City of Pendleton Air Quality Commission Update 2/18/20, Greg Lacquement, City of Pendleton, personal communication, 2/4/21

Umatilla County Air Quality and Smoke Management Program

Umatilla County has a Smoke Management Program, established in 1999, that works to minimize the negative impacts of smoke and particulate matter in our air. The Program fundamentally controls the burn day designation based on data Umatilla County receives each day from the National Weather Service (NWS) and the National Oceanic and Atmospheric Administration (NOAA). Umatilla County has a burn permit requirement for unincorporated parts of Umatilla County that is administered through the Planning Department.[18]

In Section 95.10 of the Umatilla County Code of Ordinances (hereafter called the Ordinance), an Operating Plan was required to be adopted for the Smoke Management Program. The Umatilla County Code of Ordinances also required the establishment of the Umatilla County Smoke Management Committee, which in turn crafted a *Smoke Management Operating Plan* (*Operating Plan*). The *Operating Plan* was adopted April 17, 2013.[19]

The *Operating Plan* describes that the Smoke Management Committee, in cooperation with the Planning Department, will coordinate the activities required by the Ordinance. In addition, they will periodically review the operation of the Smoke Management Program. Once a year they will prepare a report concerning the annual operation of the Program, and recommend modifications to the County Board of Commissioners. The *Operating Plan* serves as the official guide to implementing the Smoke Management Program.

The *Operating Plan* provides details on the members of the Smoke Management Committee such as who shall be appointed, terms of service, function and purpose, and so forth. The *Operating Plan* also describes the daily Burn Day Determination; Data Capture and Analysis; Permits; Complaints; Public Information; Enforcement; Haze Reduction Days; Designated No Burn Days; the Relationship to Fire Prevention and Control Agencies, City, and Rural Fire Departments; Burn Line Information; the Umatilla County Smoke Management Webpage; Ordinance Provisions; and the Burn Jurisdiction Flow Chart. Additional details about Umatilla County's Smoke Management Program are included in the "What Umatilla County and the Cities are Doing" section later in this Air Quality Annex.

Pendleton Air Quality[20]

The Pendleton Air Quality Commission (AQC) was established in January of 1991 to address air quality issues in Pendleton. The main purpose of the AQC has been to educate the public, with a focus on: 1) Health Issues; 2) Quality of Life Issues; and 3) Meeting Federal Clean Air Act Standards. The City of Pendleton and the AQC have worked hard to ensure that Pendleton remains an attainment area under the CAA.

Air quality parameters are monitored by DEQ at various sites throughout Oregon. These were described in the Air Quality Annex earlier. DEQ had an air monitoring station at the State Office Building in Pendleton where it monitored PM_{10} from 1997 through 1999. DEQ also has an air

[18] Gina Miller, Umatilla County, personal communication, 2/23/21

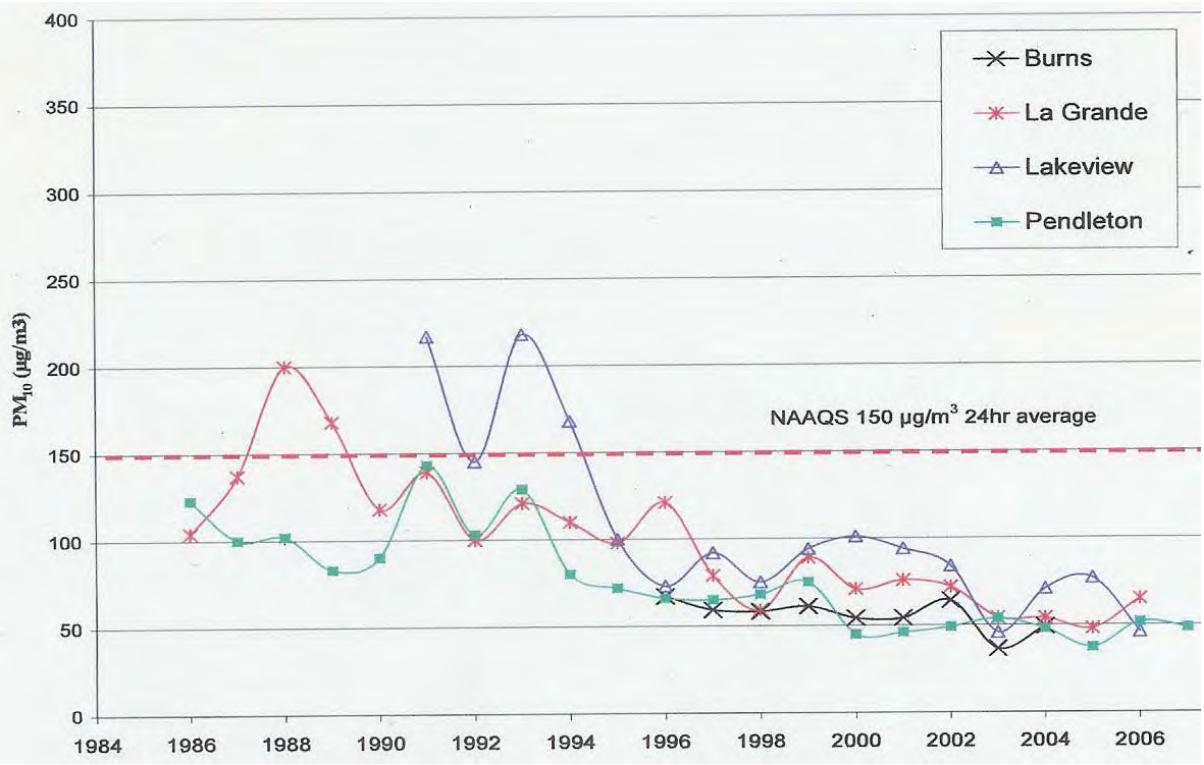
[19] Umatilla County Smoke Management Program, *Operating Plan*, 4/17/13

[20] Much of the information in this section is from the Air Quality in Pendleton Document, Greg Lacquement, City of Pendleton, personal communication, 2/4/21

monitoring station in the McKay area of Pendleton where it has monitored PM_{10} from 1997 through 2008, and $PM_{2.5}$ from 1999-2002 and continuously from 2007 to present. In addition to particulate matter, the McKay site also measures barometric pressure, temperature, wind speed, and wind direction. Particulate measure is measured both by the standard federal reference method of filtration and by a nephelometer, which is a light scattering device.

Figure AQ-5 was taken from the *2007 Oregon Air Quality Data Summaries* and demonstrates that Pendleton showed improvement in PM_{10} since highs in 1991 and 1993. Pendleton has no exceedances for PM_{10} for 1998 through 2007; monitoring for PM_{10} ended in 2008. City of Pendleton staff believe this improvement is largely due to education efforts by the City of Pendleton and the AQC. The trend in the past 10 years at other sites in Oregon has been either to be slightly decreasing in PM_{10} concentrations or relatively flat. Forest fires have also impacted the concentrations showing spikes for the years when smoke is prevalent in Oregon.

Figure AQ-5 PM_{10} Trend for Select Oregon Cities



Source: Air Quality in Pendleton Document, Greg Lacquement, City of Pendleton, personal communication, 2/4/21

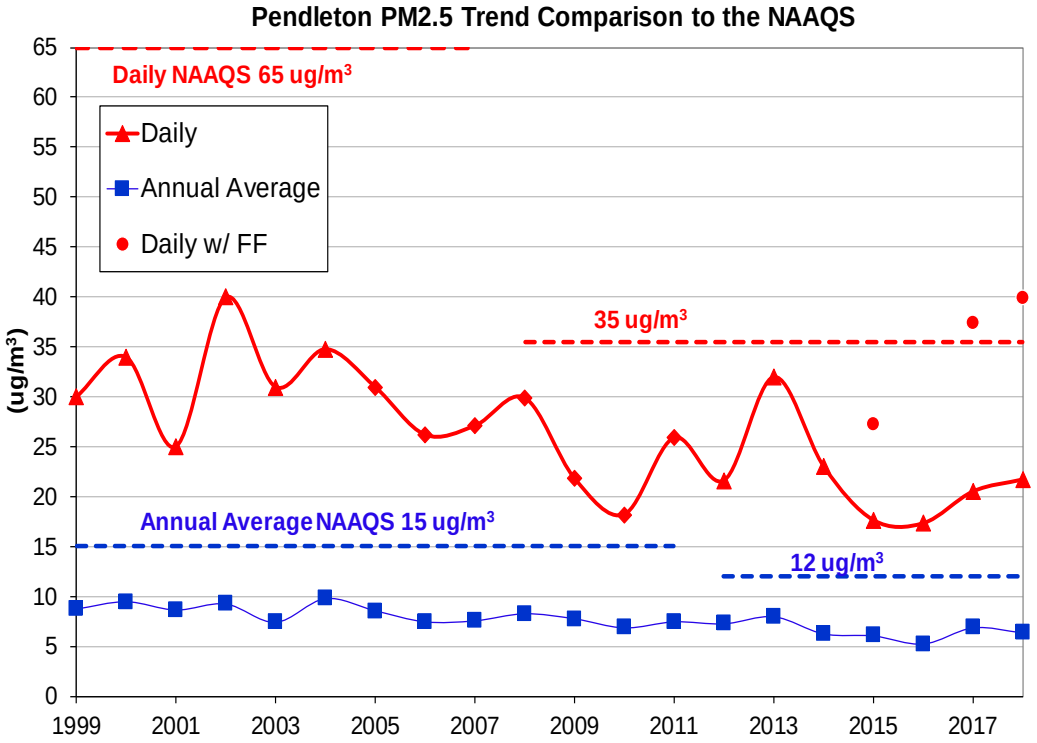
AQ-5 shows the PM_{10} trend for Eastern Oregon cities using the second highest 24-hour average through 2007. This was the last PM_{10} data for the area with the trend expected to continue to decline.

The $PM_{2.5}$ standard was first promulgated in 1997 by the EPA and DEQ at a level of 65 µg/m3. Initial monitoring showed most areas in Oregon would meet the new standard. The change in the 24-hour $PM_{2.5}$ standard from 65 µg/m3 to 35 µg/m3 in 2006 initially presented a number of challenges for

cities throughout the nation and Oregon, including Pendleton. As of 2018, the City of Pendleton is doing very well with $PM_{2.5}$, with very good air quality in reference to the daily and annual standard.

Figure AQ-6 shows $PM_{2.5}$ 24-hour standard, 98th percentile basis year to year, and annual average values. As shown in the graph in Figure AQ-6, Pendleton had an exceedance of the 24-hour $PM_{2.5}$ standard in 2002 and was at the standard in 2004. However, since that time the multiple air quality improvement programs have been effective in improving the air quality and the weather has also helped keep the $PM_{2.5}$ levels below the standard. Some years have been better than others, primarily due to unstable weather patterns (good years) and lengthy inversions (poor years).

Figure AQ-6 Pendleton $PM_{2.5}$ Trend Comparison to the NAAQS



Source: Air Quality in Pendleton Document, Greg Lacquement, City of Pendleton, personal communication, 2/4/21

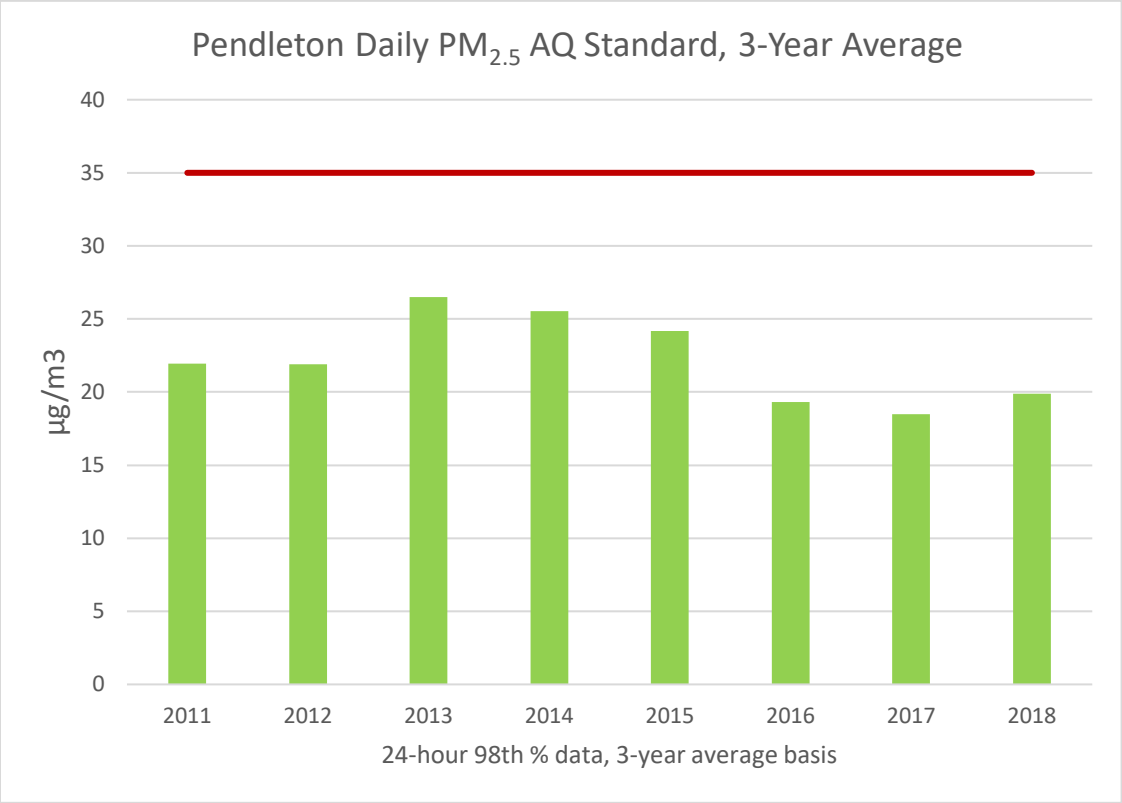
PM2.5 24-hour standard, 98th percentile basis year to year, with wildfire smoke excluded. Annual $PM_{2.5}$ levels in Pendleton year 1999 to 2018. Wildfire smoke is excluded from the data, however is shown for the daily standard for the past 4 years in red dots on the chart.

The annual average values for the area have consistently been below the annual NAAQS of 12 µg/m3 as seen in Figure AQ-6.

Compliance with the 24-hour standard is officially measured as the 3-year average of the annual 98th percentile values. The recent compliance comparison is for the 2016-2018 data years and is shown below along in Figure 3 with the 3-year data trends for the past eight years. This shows that in any individual year the Pendleton area may be more challenged to meet the level of the 24-hour NAAQS, yet on the 3-year basis the area is doing very well and is currently well below the standard. These values do not include the high level spikes of poor air quality due to wildfire smoke. As allowed by the NAAQS valuation basis, wildfire smoke can be excluded from determining compliance with the 24-hour and annual standards.

Figure AQ-7, below, shows the 3-Year rolling average values for $PM_{2.5}$ compliance in Pendleton

Figure AQ-7 Pendleton Daily $PM_{2.5}$ AQ Standard, 3-Year Average



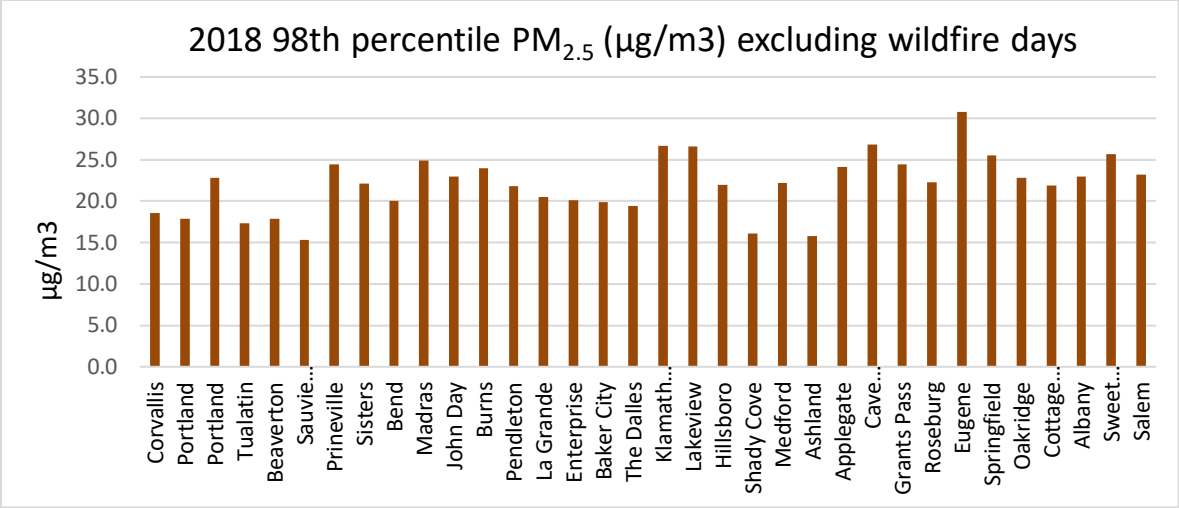
Source: Air Quality in Pendleton Document, Greg Lacquement, City of Pendleton, personal communication, 2/4/21

Figure AQ-7 shows compliance demonstration with the 24-hour NAAQS. The red line is the level of the NAAQ Standard of 35 µg/m3.

$PM_{2.5}$ data trends show a gradually improving situation other than for the impacts from wildfire smoke. The AQ Commission continues to work on improving the air quality in Pendleton, which is to the benefit of all the residents in the area. Although the NAAQ Standards are being met, there is the underlying knowledge that even lower exposures to $PM_{2.5}$ are better for our health, with the emphasis on reducing the day to day exposures reflected in the annual average.

The 2018 data year for most of Oregon is shown in Figure AQ-8 to allow comparisons of Pendleton to different areas in the state.

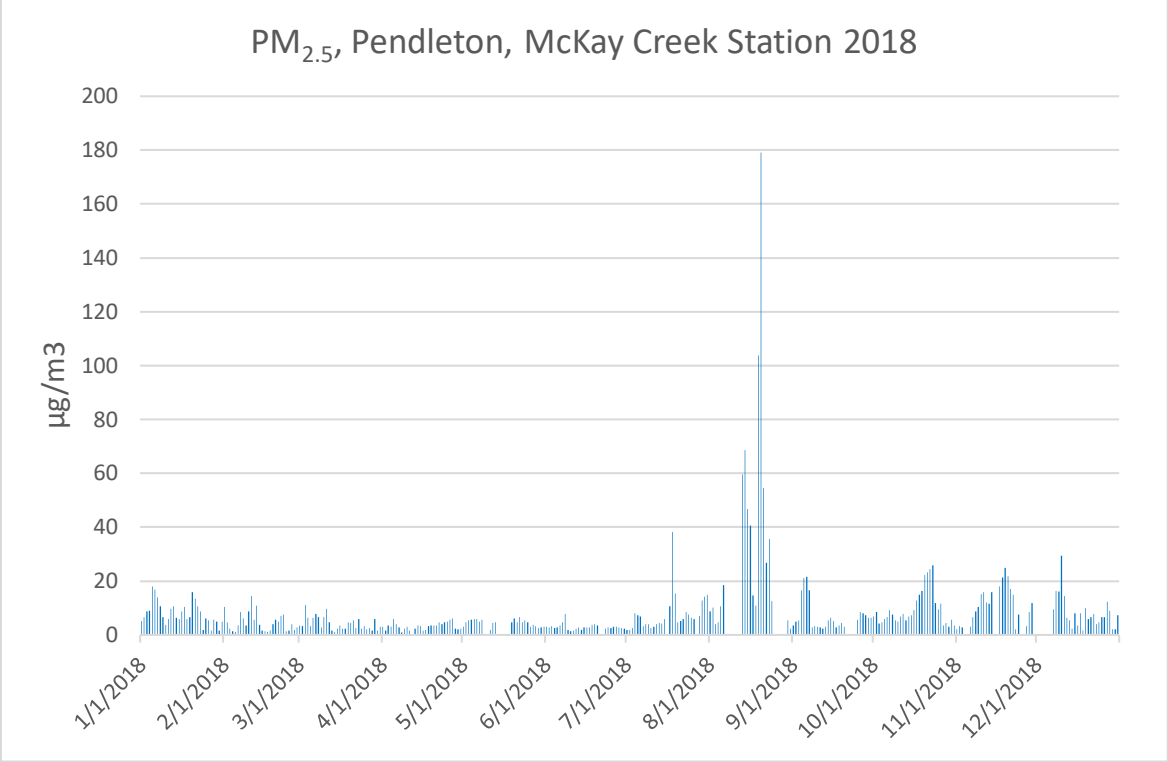
Figure AQ-8. Air Quality in Many Oregon Cities, 2018.



Source: Air Quality in Pendleton Document, Greg Lacquement, City of Pendleton, personal communication, 2/4/21

Figure AQ-9 Daily $PM_{2.5}$ Readings in 2018 at the Pendleton AQ Monitoring Station

Figure AQ-9 shows the daily $PM_{2.5}$ readings in 2018 at the Pendleton air quality monitoring station based on nephelometer data. The daily standard is set at 35 µg/m3. Notice the summer days with wildfire impacts and the somewhat higher $PM_{2.5}$ levels seen in January, November and December. The gap in data from early December is a period when the monitor was in need of repair.



Source: Air Quality in Pendleton Document, Greg Lacquement, City of Pendleton, personal communication, 2/4/21

Figure AQ-10 Air Inversion and Fog in the McKay Valley, Pendleton, OR

Source: Air Quality in Pendleton Document, Greg Lacquement, City of Pendleton, personal communication, 2/4/21, *Photo courtesy Joe Solomon, NWS*

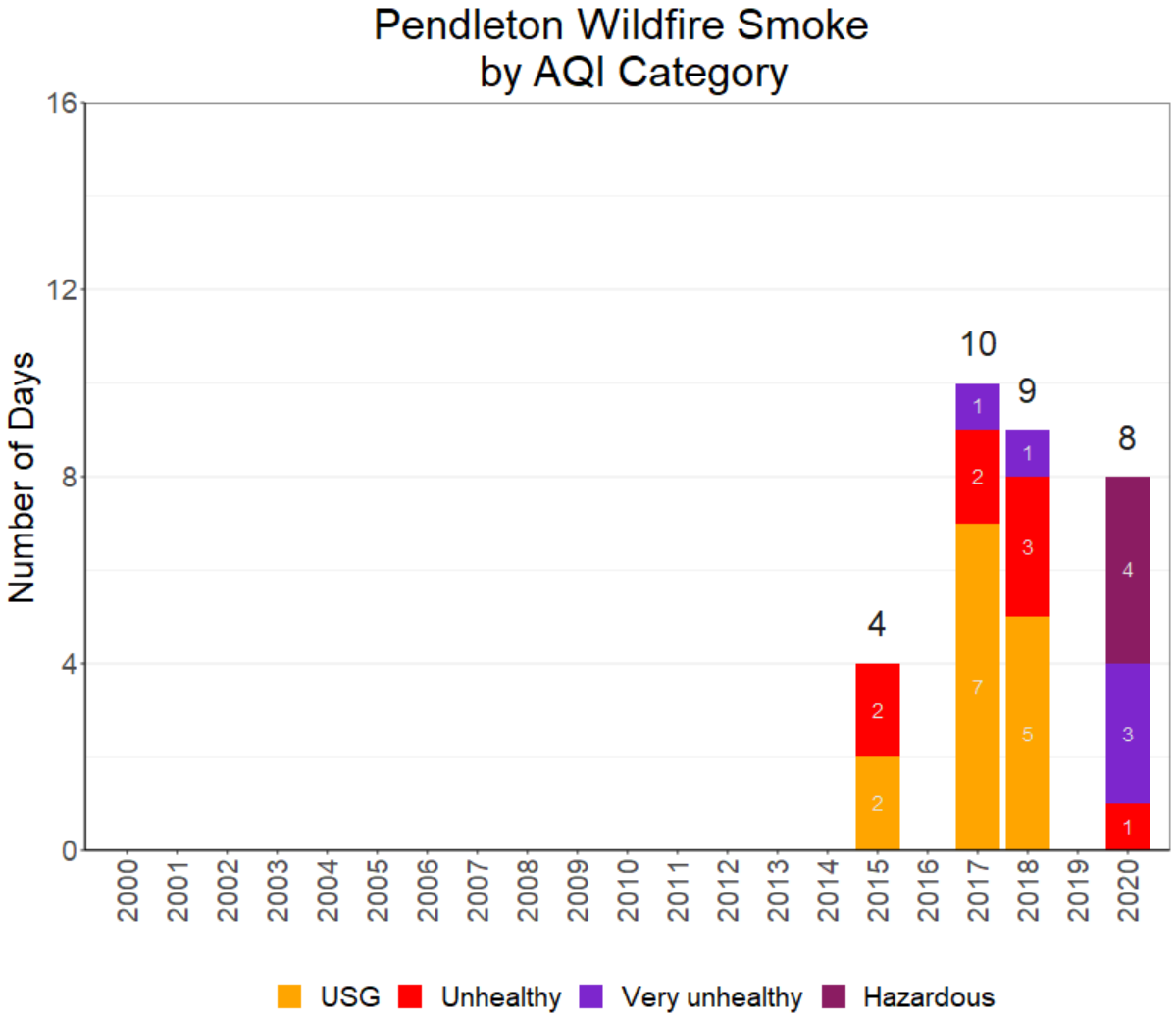
Although the City of Pendleton cannot affect changes in the weather, the City is concerned about the location of DEQ's McKay Creek monitoring station. The monitoring station is located in a residential area adjacent to several homes with wood stoves.

The City of Pendleton and Air Quality Commission, along with the Confederated Tribes of the Umatilla have and continue to install low-cost air quality sensors around the community. Umatilla County has expressed a desire to purchase and install air quality monitors around the County.

The Pendleton Air Quality Commission has purchased and placed five sensors, called Purple Air sensors. They are located at the McKay station, the City Wastewater Treatment Plant, City Hall, City Shops, City Water Filtration Plant and the Eastern Oregon Regional Airport. While these monitors may not be as reliable or accurate as the one at the DEQ monitoring station at McKay Creek, they are a great indicator of the local air quality and can be used to view trending data information and the quality of air more specific to that exact location. PM2.5 can vary depending on inversion levels, elevation of location, and exposure to winds, so the data from these various monitoring locations will be valuable to the community. A link to the Purple Air monitoring web page is provided later in this Air Quality Annex.

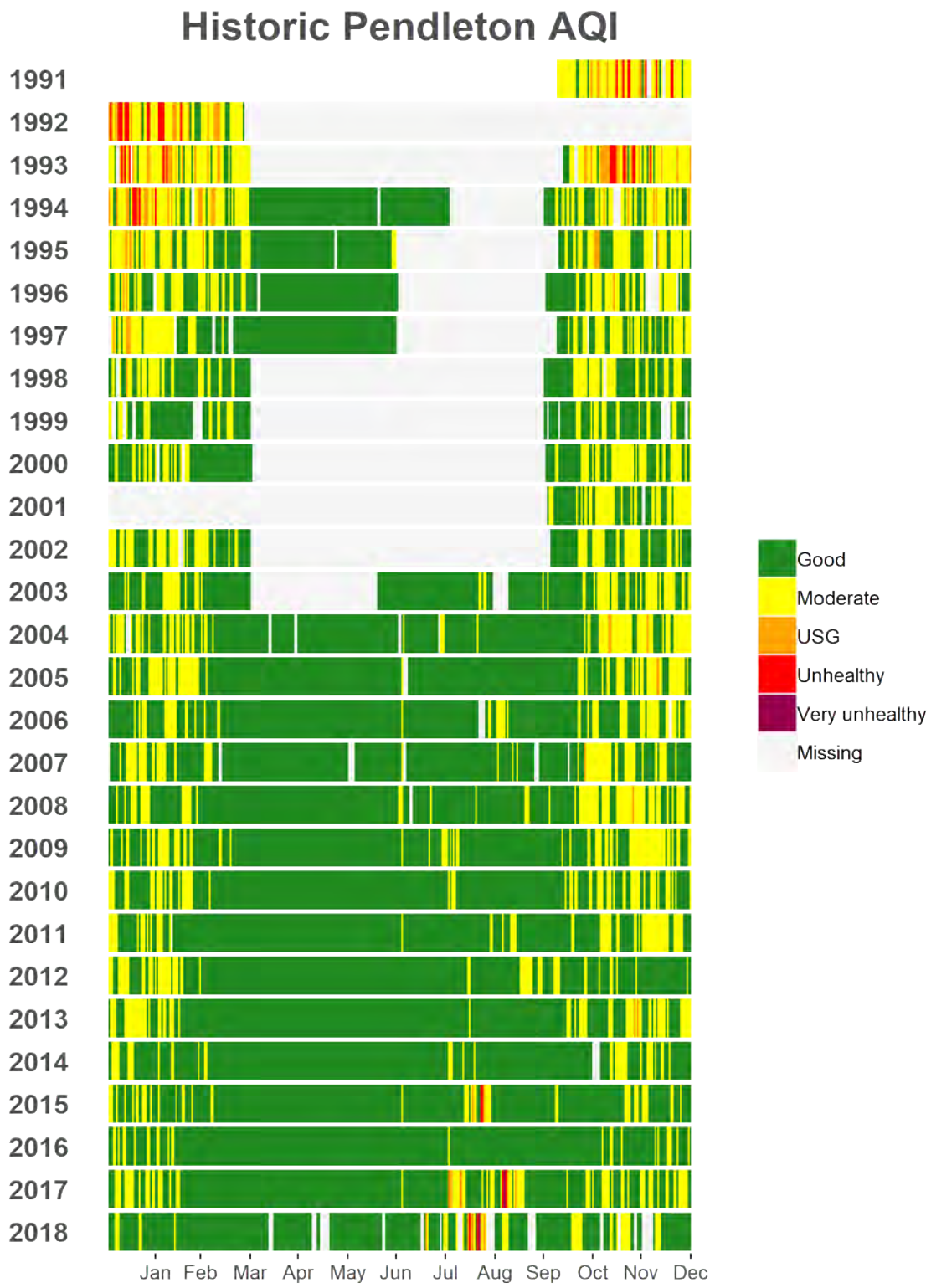
The next two figures provide a graphic illustration of air quality in Pendleton. These have been provided by Peter Brewer of DEQ.

Figure AQ-11 Pendleton, OR Wildfire Smoke by AQI Category



Source: Peter Brewer, DEQ, personal communication, 2/22/21

Figure AQ-12 Pendleton, OR AQI Levels 1991-2018



Source: Peter Brewer, DEQ, personal communication, 2/22/21

Risk Assessment

How are Hazards Identified?

The natural hazards that impact the community are identified during the update of the NHMP. See the next section, Hazard Risk Analysis for the *2021 Umatilla County NHMP* update process that identified air quality as a new natural hazard for the community.

With air quality, there are multiple air pollutants that the federal government requires the state to monitor. As described previously, the air pollutants of $PM_{2.5}$, air toxics, ozone, and greenhouse gases are the most concerning to DEQ presently. Other air pollutants that are monitored are carbon monoxide, nitrogen dioxide, sulfur dioxide, and PM_{10}. The Air Quality Index (AQI) is calculated.

The AQI is computed hourly for $PM_{2.5}$ and ozone. A rating of good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy, and hazardous are designated for the AQI number and that provides an air quality rating. See Table AQ-1 which shows the six AQI air quality ratings.

Hazard Risk Analysis

The Umatilla County NHMP Steering Committee completed a Hazard Vulnerability Assessment/Analysis (HVA) during this NHMP update. This was described in Section 2 Risk Assessment. The method used for the HVA was developed from a Federal Emergency Management Agency (FEMA) tool that has been refined by the Oregon Office of Emergency Management (OEM). It addresses and weights (shown as percent within parentheses) probability (29%), vulnerability (21%), maximum threat (42%) and the history (8%) of each natural hazard and attributes a final hazard analysis score. The methodology produces scores that range from 24 to 240.

For local governments, conducting the HVA is a useful step in planning for hazard mitigation. The method provides the jurisdiction with a relative ranking from which to prioritize mitigation actions, but does not predict the occurrence of a particular hazard.

In the *2014 Umatilla County NHMP*, air quality was not an identified natural hazard. In the *2021 Umatilla County NHMP*, air quality was added by the NHMP Steering Committee. In the Hazard Vulnerability Analysis, it ranked second out of the nine natural hazards (removed weather emergencies and added air quality).

For more information on all the risk scores and ranks of the natural hazards, see Volume I Basic Plan, Section 2 Risk Assessment of this NHMP.

Probability Assessment

As mentioned earlier, the Pendleton area can experience air stagnations. Depending upon climate conditions, these stagnations can be infrequent or numerous in any given year, which can have a potential impact to air quality levels for both $PM_{2.5}$ and ozone in the area.[21] Prevailing wind direction and strength can influence the location and extent of the air quality impacts. The probability of air quality at one level or another varies, as air quality is a range based on multiple factors such as those measured for CO, $PM_{2.5}$ and others described in this Air Quality Hazard Annex.

[21] Rachel Sakata, DEQ, personal communication, March 1, 2017.

The sources of air pollution in the region include wood stove, industrial, and motor vehicle emissions. Industry and residential wood stoves emit particulate matter and carbon monoxide. Concerns for air quality arise when smoke from regional wildfires either blows through the valley or becomes trapped during inversions. See the Wildfire Hazard Annex and Section 2 Risk Assessment for more information about wildfire impacts. In addition, climate change has a relationship with natural hazards. For details on the climate change impacts, see Appendix E.

Within Appendix F there are two documents, the *Future Climate Projections: Umatilla County* and the *Climate Change Two-Page*r.

Several key points from the *Future Climate Projections* report are shared here:

- Climate change is expected to result in a longer wildfire season with more frequent wildfires and greater area burned (Sheehan *et al.*, 2015). Wildfires are primarily responsible for days when air quality standards for PM2.5 are exceeded in western Oregon and parts of eastern Oregon (Liu *et al.*, 2016), although woodstove smoke and diesel emissions are also main contributors (Oregon DEQ, 2016).
- Under future climate change, the risk of wildfire smoke exposure is projected to increase in Umatilla County.
- In Umatilla County, the number of "smoke wave" days is projected to increase by 141% and the intensity of "smoke waves" is projected to increase by 82% by 2046–2051 under a medium emissions scenario compared with 2004–2009.

With increased wildfire risk, which is described and illustrated in the *Future Climate Projections* report as very high fire danger days per year, the risk of poor air quality, expressed in smoke wave days, is increased too. Although usually thought of as being a summer occurrence, wildfires can occur during any month of the year. The vast majority of wildfires burn during June to October time period, but over the years there have been more numerous, bigger fires and a wildfire season that extends beyond the past years' typical timeframes. The wood stove, industrial, and motor vehicle emissions can occur during any month of the year.

Vulnerability Assessment

Poor air quality puts the health of all persons at risk. The effects of poor air quality are long-term, chronic, and often difficult to trace. Those persons most at risk tend to be the elderly, very young children, and people with pre-existing respiratory problems. As noted above, according to DEQ, particulate matter in smoke poses a serious air pollution threat to public health.[22]

The increase in wildfires that produce smoke and impact air quality exacerbates people with underlying medical conditions such as, respiratory diseases.[23]

Oregon Smoke Information is a website put together by city, county, tribal, state, and federal agencies to coordinate and aggregate information for Oregon communities that are affected by

[22] Rachel Sakata, DEQ, personal communication, March 1, 2017.

[23] Beth DePew, Oregon Health Authority, personal communication, September 21, 2016.

wildfire smoke. The information on the website is posted by the agencies, but the site was built and is maintained by volunteers.[24]

One NASA study noted that "Researchers believe recent fire seasons give a taste of the more active wildfires of the future. Such fires are likely to increase air pollution, even as emissions from industry and motor vehicles have fallen in recent decades." Furthermore, "The U.S. has really made great strides in reducing man-made particles," said study co-author Loretta Mickley of Harvard University. Now, she said, "wildfires dominate poor air quality in the West." The study identifies that wildfires contribute roughly 18 percent of the total particulate emissions in the U.S.[25]

That same study noted,

> "Globally, fine particles have been linked to more than 3.3 million premature deaths Particulate pollution, one of the results of burning matter, can cause a slew of health problems, including chronic obstructive pulmonary disease, acute lower respiratory illness, asthma, ischemic heart disease, and lung cancer.
>
> Using atmospheric and climate models, the research team found that more than 82 million people are likely to experience an increase in the frequency and duration of smoke waves. Northern California, western Oregon, and the Great Plains are among areas that researchers estimate will be hit hardest by particulate matter ($PM_{2.5}$) in the atmosphere.
>
> Wildfires are difficult to predict because they're variable one day to the next and one year to the next, said Jason West, a professor of environmental science at the University of North Carolina. The new research is valuable, he said, because it places the fires into a health context. What's interesting [about the study] is that it shows that climate change can have a direct impact on public health, said Mickley. We're used to thinking of climate change as affecting temperatures and rising sea levels. This is something different that requires a lot of resources to control, affects millions of people, and it has been overlooked."[26]

Carbon monoxide (CO) can cause harmful health effects by reducing oxygen delivery to the body's organs, especially the heart, brain, and tissues. At extremely high levels, CO can cause death. Exposure to CO can reduce the oxygen-carrying capacity of the blood. People with several types of heart disease already have a reduced capacity for pumping oxygenated blood to the heart, which can cause them to experience myocardial ischemia (reduced oxygen to the heart), often accompanied by chest pain (angina), when exercising or under increased stress. For these people, short-term CO exposure further affects their body's already compromised ability to respond to the increased oxygen demands of exercise or exertion.[27]

[24] Oregon Blog Spot, *Oregon Smoke Information*, http://oregonsmoke.blogspot.com, accessed 7/24/19.

[25] National Aeronautics and Space Administration (NASA) Earth Observatory, *Increased fire comes with increased health risks*, retrieved September 2, 2016 from http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=88611&eocn=home&eoci=nh

[26] Ibid.

[27] U.S. Environmental Protection Agency, *Carbon monoxide (CO) pollution in outdoor air*, retrieved from https://www.epa.gov/co-pollution.

Ozone reacts with molecules in the lining of our airways. Chemical bonds break and reform in different ways with the addition of oxygen atoms (the process of oxidation) from ozone, and this causes acute inflammation. The lining of our airways loses some of its ability to serve as a protective barrier to microbes, toxic chemicals, and allergens. Our airways respond by covering the affected areas with fluid and by contracting muscles. Breathing becomes more difficult.

Shortness of breath, dry cough or pain when taking a deep breath, tightness of the chest, wheezing, and nausea are common responses to ozone. Ozone also triggers asthma and may aggravate other respiratory illnesses such as pneumonia and bronchitis. Ozone concentrations can make the small bands of muscles that help control breathing more sensitive to dry air, cold or dust, so ozone exposure may increase allergic responses in susceptible people.

While the effects of acute, short-term episodes of ozone exposure are reversible, the human body's response to long-term exposure may not be reversible. Exposure to ozone at levels we commonly encounter in our own communities permanently scars the lungs of experimental animals, causing long-term impairment of lung capacity, or the volume of air that can be expelled from fully inflated lungs. Ozone may have similar effects on human lungs. Studies in animals suggest ozone may reduce the human immune system's ability to fight bacterial infections in the respiratory system.

Ozone damage to people can occur without any noticeable signs. Even when initial symptoms appear, they can disappear while ozone continues to cause harm. Otherwise healthy people can expect to experience acute but reversible effects if they exercise regularly outdoors when ozone levels are high. The National Institute of Environmental Health Sciences (NIEHS) considers such people to be especially susceptible as a group.[28]

Particulate matter is also known as particular pollution; it is a complex mixture of extremely small particles and liquid droplets that get into the air. Once inhaled, these particles can affect the heart and lungs, and cause serious health effects.[29] The size of particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometers in diameter pose the greatest problems, because they can get deep into lungs and the bloodstream. Exposure to such particles can affect both the lungs and heart. People with heart or lung diseases, children, and older adults are the most likely to be affected by particle pollution exposure.[30]

[28] National Aeronautics and Space Administration Earth Observatory, *The Ozone we Breathe*, retrieved September 1, 2016 from http://earthobservatory.nasa.gov/Features/OzoneWeBreathe/ozone_we_breathe2.php.

[29] U.S. Environmental Protection Agency, *Ozone Pollution*, retrieved September 1, 2016 from https://www.epa.gov/ozone-pollution.

[30] Ibid.

Numerous scientific studies have linked particle pollution exposure to problems, including:
• premature death in people with heart or lung disease,
• nonfatal heart attacks,
• irregular heartbeat,
• aggravated asthma,
• decreased lung function, and
• increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.[31]

Fine particles ($PM_{2.5}$) are the main cause of reduced visibility (haze) in parts of the United States, including many of our treasured national parks and wilderness areas. Particles can be carried over long distances by wind and then settle on ground or water. Depending on their chemical composition, the effects of this settling may include:
• making lakes and streams acidic,
• changing the nutrient balance in coastal waters and large river basins,
• depleting the nutrients in soil,
• damaging sensitive forests and farm crops,
• affecting the diversity of ecosystems, and
• contributing to acid rain effects.[32]

PM can stain and damage stone and other materials, including culturally important objects such as statues and monuments. Some of these effects are related to acid rain effects on materials.[33]

Community Hazard Issues

What is susceptible to damage during a hazard event?

Threat to Life and Property

Humans breathe and the quality of the air they breathe, both indoor and outdoor, is essential to their well-being. As has been described, the air can be contaminated with air pollutants at any time of the year in both large and small geographies. Impacts to humans can range widely, but is especially impactful to vulnerable populations such as the elderly and those that are ill. It has also been noted that buildings can be stained and deteriorate due to air pollutants. Transportation routes may be limited or closed due to air that has ashfall in it.

Personal Choices

Humans can make choices to not use wood stoves, to drive less, to follow rules and advisories that are provided by agencies such as DEQ.

[31] U.S. Environmental Protection Agency, *Particulate Matter (PM) Pollution*, retrieved from https://www.epa.gov/pm-pollution.

[32] Ibid.

[33] Ibid.

Private and Public Lands

Both private and public lands are both subject to air quality and impacts.

What Umatilla County and the Cities are Doing

Umatilla County Overview[34]

As described earlier, the Umatilla County Smoke Management Program includes the Smoke Management Committee and they work in collaboration with the Planning Department to coordinate the activities required by the Umatilla County Code of Ordinances. Much of the information described below for Umatilla County's Smoke Management Program is from the Umatilla County Smoke Management *Operating Plan*.

Umatilla County Smoke Management Committee

The Board of County Commissioners appoints members of the Smoke Management Committee, which is composed of no less than seven members generally representing: various geographic areas of the County; major commodities produced in the county which rely on burning as a significant management practice; fire districts; city fire departments or other fire protection agencies; and the president of the Umatilla County Grass Seed Growers Association or a designee.

Umatilla County Burn Day Determination

The Daily Burn Determination is made by Dispatch staff by 6 am each day. The staff will update the Burn Line and the website. The Burn Determination is based on data from the NWS website "Air Transport and Stability Weather Forecast for the Eastern Columbia Basin." There are four possible determinations for any given day. There is a table in the *Operating Plan* that describes those.

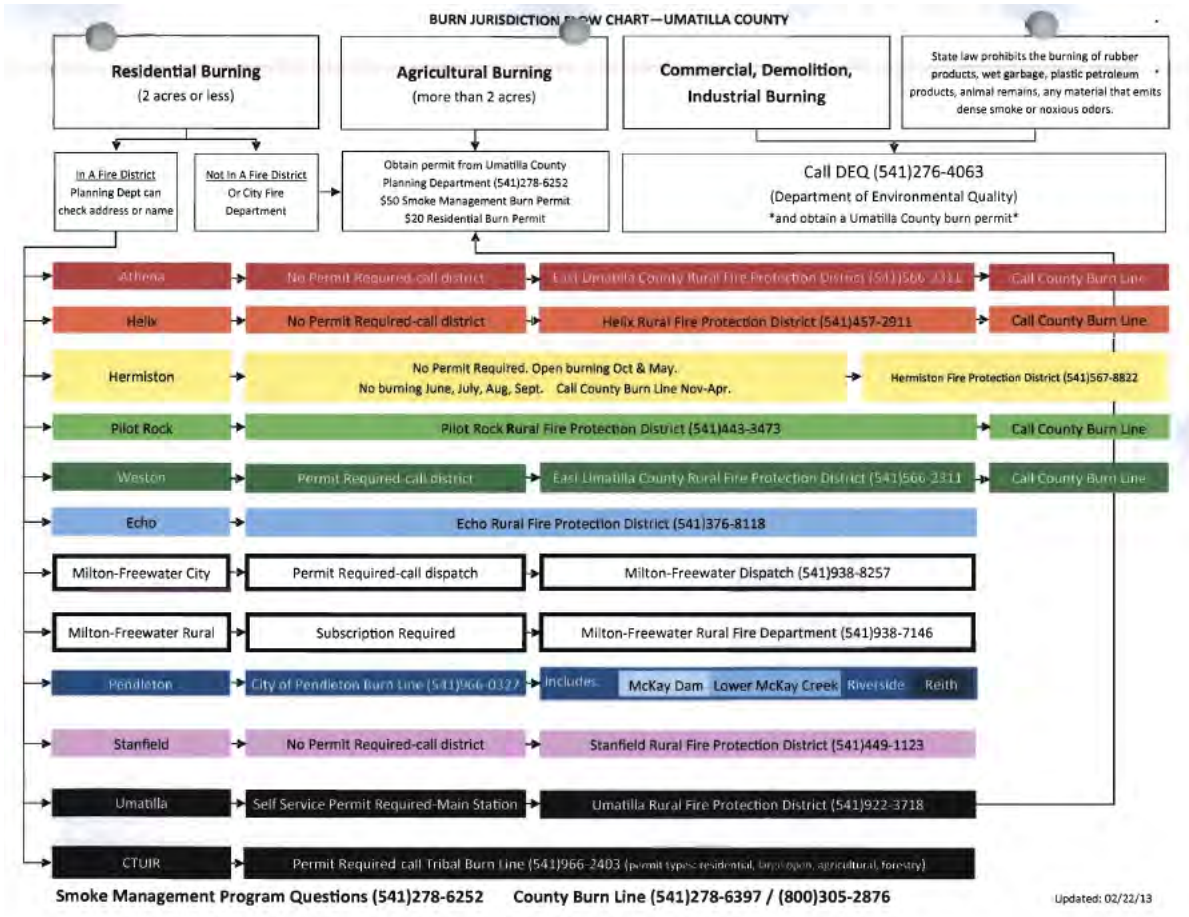
Umatilla County Permits

Smoke Management Permits are issued by the Umatilla County Planning Department and are valid for one year. Copies of the permits are shared with Dispatch for the purposes of providing emergency contact information to Dispatch. Note that Residential Burn Permits are required for non-agricultural burning on properties that are not located in a fire district.

See the Burn Jurisdiction Flow Chart in Figure AQ-13 for information about each of the jurisdictions in Umatilla County and the burn permit requirements.

[34] Umatilla County Smoke Management Program, *Operating Plan*, 4/17/13

Figure AQ-13 Umatilla County Burn Jurisdiction Flow Chart



Source: *Umatilla County Smoke Management Program Operating Plan*, 4/17/13

Umatilla County Data Capture and Analysis

The Code Enforcement assistant will retain a daily record of the Burn Determinations and the Burn Line log entries, and will add to the Burn Record. Burn Decision data from CTUIR will also be logged by the Code Enforcement assistant into the daily Burn Record. A summary of the information will be reported to the Smoke Management Committee at the annual meeting. As of March 2021, Umatilla County current does not have their own air quality monitors but would like to purchase them.

Umatilla County Complaints and Public Information

Incoming complaints are logged into the Burn Record by the Code Enforcement assistant. These are reported to the Planning Director for follow-up and resolution. A summary of the complaints and actions will be reported to the Smoke Management Committee at the annual meeting. Umatilla County maintains a Smoke Management and Burn Information website, http://www.co.umatilla.or.us/jail/burnday.html. Dispatch staff update this webpage on a daily basis prior to 6 am or as soon as possible regarding burn information. The Umatilla County Smoke Management Facebook page is also updated on a daily basis. Both the website and the Facebook page contain additional information about permits and other matters.

Umatilla County Enforcement

Enforcement is handled by the Code Enforcement program. See the provisions of Chapter 95.09 for penalties and proceedings.

Umatilla County Haze Reduction Days

Open burning shall be more strictly regulated on designated Haze Reduction Days to protect the public health, safety and aesthetic character of days when larger numbers of persons typically participate in outdoor days. There is a list of Haze Reduction Days in the *Operating Plan*.

Umatilla County Designated No Burn Days

The *Operating Plan* has a list of days that are automatically No Burn Days.

Umatilla County Relationship to Fire Prevention and Control Agencies, City, and Rural Fire Departments

The *Operating Plan* describes that the Smoke Management Committee will continue to coordinate objectives for smoke management in Umatilla County with the Fire Prevention and Control Agencies, City, and Rural Fire Departments, and CTUIR. The Committee members and representatives from the partnering agencies will participate in the annual meeting and coordinate with County staff throughout the year to identify improvements to the program.

Pendleton Wood Stove Replacement Program [35]

The City of Pendleton and the Pendleton AQC have implemented a number of programs to improve air quality in Pendleton. Foremost among those programs is the City's Wood Stove Replacement Program. The program provides residents with a no-interest loan, to be paid back over five years, to replace an old wood stove or wood stove insert.

City of Pendleton has had three Wood Stove Replacement Programs, which will be designated as Phase 1, Phase 2, and Phase 3. Phase 1 began in 2000 and ended in 2002. During Phase 1, there were 93 stoves replaced, and approximately $238,000 was loaned to participants. Phase 1 of the program was considered very successful because of the number of stoves replaced and the amount of money loaned. It was a huge benefit to the homeowners, local contractors, and to improved air quality.

Phase 2 of the Wood Stove Replacement Program began in 2004 and ended in 2006. During Phase 2, only 13 stoves were replaced, and approximately $34,000 was loaned.

Phase 3 of the Wood Stove Replacement Program began in 2007 and is on-going. As of January, 2021, we have changed out another 88 wood stoves. The City intends to continue the program on a limited basis in the future, and generally sees a few woodstoves each year replaced or primarily changed out to some other form of heat.

It is difficult to prove that the Wood Stove Replacement Program improved air quality in Pendleton even though there has been a significant improvement in PM_{10} from 1996 to 2008 and in $PM_{2.5}$ up to the present. Air quality is largely dependent on weather patterns. Inversions play a major role in Pendleton's air quality. Some years the area experiences longer inversions and periods of air stagnation than other years, yet now air quality appears to be below the NAAQS to stay. When cold air masses settle and become trapped in the low-lying valleys of Pendleton, particulates begin to

[35] Air Quality in Pendleton Document, Greg Lacquement, City of Pendleton, personal communication, 2/4/21

accumulate in the valleys. Particulates accumulate and increase when these inversions last several days, and that is primarily when high levels of both PM_{10} and $PM_{2.5}$ occur.

Pendleton Air Pollution Control Ordinance[36]

In 2008, the AQC, the Pendleton Fire Department, and the City worked through a number of issues and developed and later passed the *Pendleton Air Pollution Control Ordinance*, Ordinance 3766, in June, 2008. The ordinance governs both wood stove burning and open burning within the City of Pendleton. It requires the City to determine and issue a daily Air Quality Forecast from October 1 through June 15 the following year. The forecast is made available to the public on a dedicated Burn Line and on the City's website. The ordinance requires any person who conducts open burning or residential burning in a wood burning stove within the City of Pendleton to contact the Burn Line and comply with the forecast restrictions. The Ordinance also prohibits the open burning of any restricted materials, and burn barrels are prohibited inside the City limits.

Data from the National Weather Service and data from DEQ's air monitoring station are utilized to determine the daily Air Quality Forecast, which has three possible designations. A GREEN DAY allows the use of wood burning stoves and open burning, but hours of open burning may be restricted. On a YELLOW DAY, no open burning is allowed and wood stove burning is restricted to DEQ- or EPA-approved wood stoves. On a RED DAY, no open burning is allowed and no wood burning stoves are allowed unless they are the sole source of heat for the household. Daily Air Quality Forecasts began October 1, 2008 and continue to the current times. As a result of these changes, there have been fewer days when open burning is allowed in Pendleton, and wood stove use has been further restricted. This has resulted in cleaner air for all those in Pendleton.

Air Education Programs[37]

The City of Pendleton has educational material available at City Shops or upon request that provide information about good wood burning practices to help citizens burn cleaner and more efficiently and to reduce air pollution.

The AQC has a number of education programs to inform citizens about air quality issues. One such program is the Good Neighbor Program. If you have a neighbor whose wood stove smoke is bothering you or a member of your family, you can request that the AQC send a "Good Neighbor Packet" to the neighbor. The packet includes information about good wood burning practices.

In fall, 2008, the AQC began an Air Education Program at Sunridge Middle School with three seventh grade science classrooms. Students learned about a variety of air quality issues such as health issues, air quality monitoring, criteria pollutants, and air pollution sources. The students kept track of the daily air quality forecast for one month and were asked to write an essay on air quality at the end of the program. Students with the three best essays were honored by the AQC. The teacher and students thought the program was very successful, so it has been continued each year. Students currently compete by creating colorful Air Education posters, answer air quality trivia questions, and students with the best posters receive prizes and have their posters featured on the City's website.

Tips for burning wood in a wood stove, information presented to persons of interest or on brochures, following the Burn Wise EPA – lead which is included here for your information.

[36] Air Quality in Pendleton Document, Greg Lacquement, City of Pendleton, personal communication, 2/4/21

[37] Air Quality in Pendleton Document, Greg Lacquement, City of Pendleton, personal communication, 2/4/21

If you utilize a wood stove, follow these tips to burn cleaner and more efficiently and to reduce air pollution.

1. If at all possible, **don't burn wood when the air quality is poor or a No Burn Day is declared, or an air stagnation advisory has been made**. For local air quality information, contact the Air Quality Forecast at 541-966-0327.

2. **Consider switching** to a cleaner, and possibly cheaper fuel to heat your home, or consider switching to a new, certified wood stove if you just have to have a woodstove. The City's Wood Stove Replacement Program can assist you in replacing older, uncertified wood stoves and wood stove inserts.

3. **Burn only seasoned, dry firewood**. That means no garbage, plastics, rubber, paint or oil, no painted or treated wood, particleboard, plywood, coal or charcoal briquettes, and no glossy or colored paper. Burning things like that can produce fumes that may be toxic and can foul your catalytic converter, your flue, and cause serious health problems for you, your family and your neighbors.

4. **Build small, hot fires** instead of large, smoldering ones. Don't damper down your fire because that causes inefficient burning and creates lots of smoke.

5. **Watch those smoke signals.** If you are sending up a lot of smoke, this means your fire is burning inefficiently and you are producing air pollution. Increase the amount of air to the stove by opening up the damper(s).

Pendleton Resource

If you would like additional information about the Pendleton Air Quality Commission, the next AQC meeting, the Good Neighbor Packet, the daily Air Quality Forecast, or the Wood Stove Replacement Program, contact Greg Lacquement at 541-966-0249 or greg.lacquement@ci.pendleton.or.us. For additional information about state of Oregon air quality programs, visit the Oregon Department of Environmental Air Quality website at: https://www.oregon.gov/deq/aq/Pages/default.aspx, and DEQ's webpage showing the current air quality conditions around the State, including Pendleton: https://oraqi.deq.state.or.us/home/map

For additional information about federal air quality programs, visit the U.S. Environmental Protection Agency (EPA) website at https://www.epa.gov/environmental-topics/air-topics

Pendleton: for the daily air quality forecast: https://pendleton.or.us/daily-air-quality-forecast

Additional websites of interest:

EPA's AIRNOW: https://www.airnow.gov/

Wildfire Air Quality: https://www.oregon.gov/deq/aq/Pages/Wildfires.aspx

Oregon's wildfire smoke blog https://oregonsmoke.blogspot.com/

Oregon's Air Quality App: OregonAir for both iOS and Android App store

Purple Air Monitoring webpage: https://www.purpleair.com/map?#5.67/44.016/-117.232

Existing Hazard Mitigation Activities and Resources

Additional

These are resources related to air quality. Air quality can be impacted by wildfires. For information on resources related to wildfires, see the Existing Hazard Mitigation Activities and Resources section in the Wildfire Hazard Annex in this NHMP.

Zoning Ordinances

Zoning ordinances vary for each community. Checking the websites of each of the jurisdictions participating in this *2021 Umatilla County NHMP* provides the following:

- Umatilla County, http://www.co.umatilla.or.us/planning/
- Adams, http://www.cityofadamsoregon.com/
- Athena, https://www.cityofathena.com/
- Echo, https://echo-oregon.com/
- Helix, this link is on the Umatilla County website, http://www.co.umatilla.or.us/planning/city_info.html#Helix
- Hermiston, https://www.hermiston.or.us/commdev
- Milton-Freewater, https://www.mfcity.com/
- Pilot Rock, https://www.cityofpilotrock.org/
- Pendleton, https://pendleton.or.us/
- Stanfield, https://cityofstanfield.com/
- Ukiah, http://www.cityofukiahoregon.com/
- Umatilla, https://www.umatilla-city.org/
- Weston, http://www.cityofwestonoregon.com/

Emergency Operations Plan

Umatilla County Emergency Management (UCEM) coordinates with NOAA NWS when notices may be required to inform response agencies and the general public of potential emergency events. UCEM response and coordination is outlined in the Umatilla County *Emergency Operations Plan* and usually involves disseminating materials addressing shelter locations, response contact information and other information. Should an event become severe, UCEM is can activate the Emergency Operations Center (EOC) and Joint Information Center (JIC) to coordinate emergency response, evacuation and the dissemination of important public safety information.[38]

The *Umatilla County EOP*, dated January 2012 (ordinance 2012-01 passed 1/18/12), is an all-hazard plan that describes how Umatilla County will organize and respond to emergencies and disasters in the community. It is based on, and is consistent with Federal, State of Oregon, and other applicable laws, regulations, plans, and policies, including the National Response Framework, and State of Oregon Emergency Operations Plan. The *Umatilla County EOP* is one component of the County's emergency management program and is designed to be compliant with the National Incident Management System. Air quality is not one of the hazards listed in the *Umatilla County EOP*.

[38] *2014 Umatilla County NHMP*, May 2015

The *Umatilla County EOP* consists of a Basic Plan, Emergency Support Function Annexes that complement the Federal and State Emergency Support Functions, Support Annexes, and Incident Annexes. It provides a framework for coordinated response and recovery activities during an emergency. It describes how agencies and organizations in Umatilla County will coordinate resources and activities with other Federal, State, local, tribal, and private-sector partners.[39]

Umatilla County Emergency Operations Plan, http://www.co.umatilla.or.us/bcc/codes/35.pdf

State Natural Hazard Risk Assessment

The risk assessment in the *2020 Oregon Natural Hazards Mitigation Plan* provides an overview of natural hazards risk in Oregon but it does not include air quality. It has overall state and regional information and mitigation actions for the entire state.
https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

Planning for Natural Hazards: Oregon Technical Resource Guide

This guide describes basic mitigation strategies and resources related to wildfires and other natural hazards, including examples from communities in Oregon.
https://scholarsbank.uoregon.edu/xmlui/handle/1794/1909

Oregon DEQ

Oregon's Department of Environmental Quality oversees the air, land, and water quality in Oregon. The website divides information into four categories: air, land, and water; hazards and cleanup; vehicle inspection; and residential.

https://www.oregon.gov/deq/Pages/index.aspx

Future Changing Conditions/ Climate Change

In the Umatilla County NHMP, there are several locations that describe future changing conditions or climate change as it relates to the natural hazards that impact Umatilla County, the Cities, and the Special Districts. In the order of appearance in the NHMP: the Risk Assessment, the Hazards Annexes, and Appendix E contain this information. Within Appendix E there are two documents, the *Future Climate Projections: Umatilla County* and the *Umatilla County Future Projections Two-Pager Flyer.* Information from these two documents was described earlier in this Air Quality Annex. Documents such as the DEQ *Oregon Air Quality Annual Reports* describe that with climate change we expect more fires in the Pacific Northwest and higher temperature days; resulting in more elevated ozone days.

Air Quality Mitigation Action Items

The air quality (AQ) mitigation actions have been identified by the Umatilla County NHMP Steering Committee. See Table 3-1, 2021 Umatilla County NHMP Mitigation Actions for Umatilla County.

[39] Ecology and Environment, Inc., *Umatilla County Emergency Operations Plan*, January 2012.

There are nine AQ specific mitigation actions. The AQ mitigation actions have a high priority because the Hazard Vulnerability Assessment (HVA) resulted in AQ having a high risk level. The risk score for air quality was the second highest out of the nine identified natural hazards. There are multi-hazard mitigation actions for the NHMP and several of those include air quality related mitigation actions, in conjunction with the other hazards. The multi-hazard mitigation actions are a high priority.

In discussion with the Umatilla County Planning Director, the Umatilla County Emergency Manager, and the NHMP Steering Committee, it was agreed that the risk level rankings from the HVA would be used as the way to prioritize the multi-hazard and hazard-specific mitigation actions. The risk level rankings are in Table 2-4 in Section 2 Risk Assessment.

SEVERE SUMMER STORMS AND SEVERE WINTER STORMS HAZARD ANNEX

Summer Storms Risk Score: 223

Summer Storms Risk Level: High

Winter Storms Risk Score: 220

Winter Storms Risk Level: High

Causes and Characteristics of Severe Summer Storms and Severe Winter Storms

This annex describes the natural hazards of severe summer and severe winter storms; provides their hazards history; identifies probability and vulnerability, and lists the risk score and risk level for each hazard. Climate data is included. The Umatilla County NHMP Steering Committee determined a Hazard Vulnerability Assessment (HVA) risk score (described later in this Annex and previously in Volume 1 Section 2 Risk Assessment) for severe summer and severe winter storms. These weather related hazards have significant impacts on the County, Cities, and Special Districts.

In the *2014 Umatilla County NHMP*, severe summer storms were not ranked specifically but were included as part of weather emergencies. Weather emergencies were ranked first in the *2014 Umatilla County NHMP*. In the *2021 Umatilla County NHMP*, severe summer storms are ranked third out of nine hazards (removed weather emergencies and added air quality).

In the *2014 Umatilla County NHMP*, severe winter storms were not ranked specifically but were included as part of weather emergencies. Weather emergencies were ranked first in the *2014 Umatilla County NHMP*. In the *2021 Umatilla County NHMP*, severe winter storms are ranked fourth out of nine hazards (removed weather emergencies and added air quality).

Severe Summer Storms

Extreme winds occur throughout Oregon and can occur in summer and winter. The most persistent high winds take place along the Oregon Coast and in the Columbia River Gorge. However, extreme weather events occur in all regions of Oregon.[1] West winds generated from the Pacific Ocean are strongest along the coast and slow down inland due to the obstruction of the Coastal mountain range. Prevailing winds in Oregon vary with the seasons. In summer, the most common wind directions are from the west or northwest; in winter, they are from the south and east. Local topography, however, plays a major role in affecting wind direction.[2]

Although rare, tornados can and do occur in Oregon. Tornadoes are the most concentrated and violent storms produced by the earth's atmosphere. They are created by a vortex of rotating winds and strong vertical motion, which possess remarkable strength and cause widespread damage. Wind speeds in excess of 300 mph have been observed within tornadoes, and it is suspected that some tornado winds exceed 400 mph. The low pressure at the center of a tornado can destroy buildings and other structures.

[1] *2020 Oregon NHMP*, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_11_RA5.pdf

[2] Statesman Journal, February 8, 2002.

Tornadoes are most common in the Midwest, and are more infrequent and generally small west of the Rockies. Nonetheless, Oregon and other western states have experienced tornadoes on occasion, many of which have produced significant damage and occasionally injury or death. Oregon's tornadoes can be formed in association with large Pacific storms arriving from the west. Most of them, however, are caused by intense local thunderstorms. These storms also produce lightning, hail, and heavy rain, and are more common during the warm season from April to October.[3] Central and Eastern Oregon's relatively low population may cause many tornadoes to go unreported.[4]

Severe Winter Storms

Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. Winter storms occur over eastern Oregon regularly during December through February, even into March.[5] Relative to western Oregon, Umatilla County receives a large amount of annual snowfall. This is advantageous in at least one respect: in general, the region is prepared, and those visiting the region during the winter, usually come prepared. However, there are occasions when preparation cannot meet the challenge.

Drifting, blowing snow has often brought highway traffic to a standstill. Also, windy, icy conditions have often closed mountain passes and canyons to certain classes of truck traffic. In these situations, travelers must seek accommodations, sometimes in communities where lodging is very limited. Local residents also experience problems. During the winter, heating, food, and the care of livestock and farm animals are everyday concerns. Access to farms and ranches can be extremely difficult and present a serious challenge to local emergency managers.[6]

Ice storms can occur anywhere in Oregon. Like snow, ice storms are comprised of cold temperatures and moisture, but subtle changes can result in varying types of ice formation, including freezing rain, sleet, and hail. Freezing rain can be the most damaging of ice formations. While sleet and hail can create hazards for motorists when it accumulates, freezing rain can cause dangerous conditions within a community. Ice buildup can bring down trees, communication towers, and wires creating hazards for property owners, motorists, and pedestrians alike. The most common place freezing rain occurs in Oregon is near the Columbia Gorge, but it also poses a hazard to Umatilla County [7]

Climate Data for Umatilla County

The NOAA's National Centers for Environmental Information (https://www.ncdc.noaa.gov/) has established climate divisions in the United States for areas that have similar temperature and precipitation characteristics. Oregon's latitude, topography, and proximity to the Pacific Ocean give the state diversified climates. Umatilla County is in Climate Divisions 6 and 8 as seen in Figure SS-1.

3Taylor, George H., Holly Bohman, and Luke Foster, August 1996, *A History of Tornadoes in Oregon*, Oregon Climate Service. Corvallis, OR: Oregon State University.

4 Taylor, George; Hatton Raymond, *Oregon Weather Book*, 1999, http://osupress.oregonstate.edu/book/oregon-weather-book.

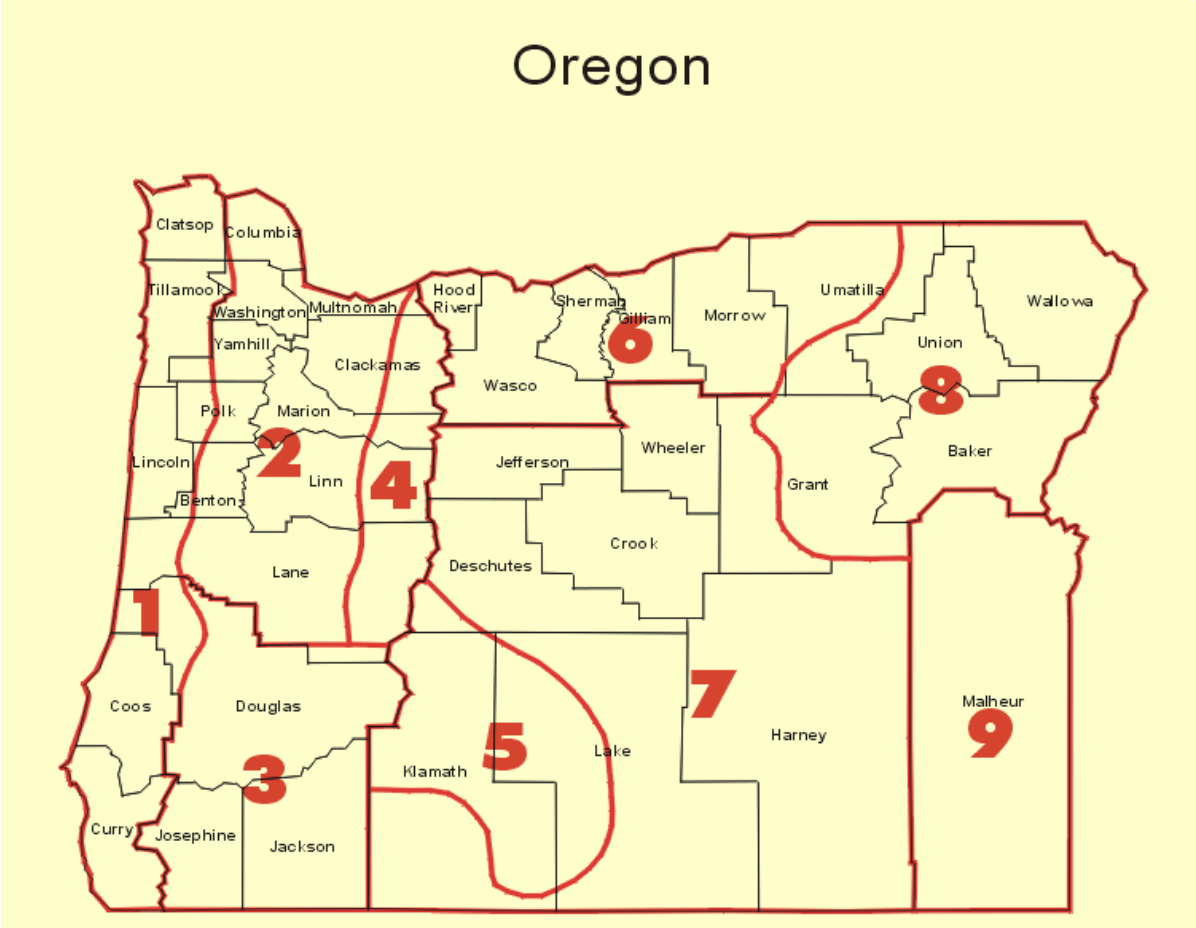
[5] *2020 Oregon NHMP*, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_05b_RAState.pdf

[6] Ibid.

[7] Taylor, George; Hatton Raymond, *Oregon Weather Book*, 1999, http://osupress.oregonstate.edu/book/oregon-weather-book.

Oregon Climate Service is the recognized American Association of State Climatologists (AASC) (https://www.stateclimate.org/about) climate office for Oregon. It is housed in the College of Earth, Ocean, and Atmospheric Science at Oregon State University (CEOAS)[8] which also houses the Oregon Climate Change Research Institute (OCCRI). OCCRI has provided climate change information for the *2021 Umatilla County NHMP*. In addition to the short description of climate change or future changing conditions in this Annex, see also Volume I Section 2 Risk Assessment and Appendix E for detailed information on climate change as it relates to natural hazards. Appendix B Community Profile also includes climate information for Umatilla County.

Figure SS-1 Oregon's Climate Divisions



Source: NOAA, National Weather Service Climate Prediction Center, https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/CLIM_DIVS/oregon.gif

Climate data such as precipitation, temperature, and hours of daylight provides a framework for understanding the climate in Umatilla County. There are four geographic areas in Umatilla County. These geographic areas include west Umatilla County (Echo, Stanfield, Hermiston, and Umatilla), central Umatilla County (Pendleton, Pilot Rock), south Umatilla County (Ukiah), and northeast Umatilla County (Helix, Adams, Athena, Weston, and Milton-Freewater).

[8]Oregon Climate Service, http://ocs.oregonstate.edu/.

Information such as precipitation, temperature, hours of daylight and so forth are included for the four geographic areas as described Appendix B Community Profile. Some of the data in Appendix B focuses on Pendleton. Here, to further describe climate data and show variation for geographic areas in Umatilla County, the Cities of Hermiston and Ukiah are included. The U.S. Climate Data website is https://www.usclimatedata.com/. According to the website, Tables SS-1 and SS-2, are based on the climate data for Hermiston, OR 97838 - 1981-2010 normals. Tables SS-3 and SS-4 are based on the climate date for Ukiah, OR, 97880 – 1981-2010 normals.

Table SS-1 Hermiston Weather Averages by Month

	Jan	Feb	Mar	Apr	May	Jun
Average high in °F	42	49	59	67	74	82
Average low in °F	26	29	34	39	46	53
Av. precipitation in inch	1.50	1.06	0.94	0.87	0.91	0.51

	Jul	Aug	Sep	Oct	Nov	Dec
Average high in °F	89	88	80	67	51	42
Average low in °F	57	57	47	38	33	27
Av. precipitation in inch	0.24	0.35	0.47	0.71	1.50	1.34

Source: U.S. Climate Data, https://www.usclimatedata.com/climate/hermiston/oregon/united-states/usor0159

Table SS-2 Hermiston Weather Averages by Year

Annual high temperature	66°F
Annual low temperature	41°F
Average annual precip.	10.4 inch

Source: U.S. Climate Data, https://www.usclimatedata.com/climate/hermiston/oregon/united-states/usor0159

Table SS-3 Ukiah Weather Averages by Month

	Jan	Feb	Mar	Apr	May	Jun
Average high in °F	38	44	50	57	64	73
Average low in °F	16	17	24	27	33	38
Av. precipitation in inch	1.79	1.25	1.46	1.55	1.82	1.44

	Jul	Aug	Sep	Oct	Nov	Dec
Average high in °F	82	83	75	63	47	38
Average low in °F	41	38	31	26	23	17
Av. precipitation in inch	0.65	0.62	0.70	1.32	2.11	2.09

Source: U.S. Climate Data, https://www.usclimatedata.com/climate/ukiah/oregon/united-states/usor0357

Table SS-4 Ukiah Weather Averages by Year

Annual high temperature	60°F
Annual low temperature	27°F
Average annual precip.	16.8 inch

Source: U.S. Climate Data, https://www.usclimatedata.com/climate/ukiah/oregon/united-states/usor0357

History of Severe Summer Storms and Severe Winter Storms in Umatilla County

All of Umatilla County is susceptible to severe weather. Table SS-5 includes a list of wind storms, winter storms, tornadoes, and other natural hazard events that have occurred in Umatilla County.

Table SS-5 Significant Severe Summer Storms and Severe Winter Storms

Date	Location	Type of Severe Weather	Description
April 21-23, 1931	Mid-Columbia Region	Wind and Dust Storm	Mid-Columbia Region dust from this event blew on an east wind into the Willamette Valley and Central Oregon Region down the Columbia Gorge and over the Cascade Mountains.
May 23, 1975	Near Echo, OR	Wind and Dust Storm	Winds up to 45 mph blew dust from nearby plowed fields, resulting in a seven car accident on a Friday afternoon in the eastbound lanes of I-84. Four injured.
March 24, 1976	Near Stanfield and Hermiston, OR	Wind and Dust Storm	Near Stanfield, 18 vehicles piled-up in two separate accidents on I-84. These accidents killed 1 and injured 20. They were caused by a dust storm that caused near zero visibility. This dust storm caused road closures both south and north of Hermiston, and caused other accidents on Highway 207 about 9 miles south of I-84.
July 9, 1979	Near Stanfield, OR	Wind and Dust Storm	The dust storm caused two deaths and six injuries in a freeway pile-up on I-84 very close to the location of the previous event. Winds near 60 mph. Some of the injured were hit as pedestrians while trying to help those already injured or pinned in vehicles.

Date	Location	Type of Severe Weather	Description
July 9, 1995	Western Umatilla County	Wind and Hail Storm	A wind and hail storm in Western Umatilla County caused millions of dollars' worth damage to vehicles, structures, and crops.
September 25, 1999	Near Echo, OR	Wind and Dust Storm	High winds blowing dust set off a chain-reaction of crashes that killed eight people and injured more than 20. In all, more than 40 vehicles crashed in separate pileups in both freeway directions between Hermiston and Pendleton. Parts of I-84 were blocked from mid-morning to midnight.
May 27, 2008	Near Adams,OR	Tornado	Funnel cloud near Adams. No confirmed touchdown.
May 6, 2009	Near Adams, OR	Tornado	Minor damage to farm equipment and outbuildings.
July 12, 2009	Near Mission, OR	Tornado	Funnel cloud near Mission. No confirmed touchdown.
April 27, 2010	Near Echo, OR	Tornado	Funnel cloud near Echo. No confirmed touchdown.
August 16, 2013	Near Vinson, OR	Tornado	Funnel cloud near Vinson. No confirmed touchdown.
June 8, 2016	Near Ukiah, OR	Tornado	Little to no damage reported.
Note	Umatilla County	Tornado	Other tornados may have occurred over mainly rural areas and were not reported or documented.
Note	Umatilla County	Tornado	Two confirmed tornadoes, several funnel clouds between Oct. 2006 – March 2020.
May 6, 2009	Near Thorn Hollow, OR	Large hail	Gold ball sized hail causing damage to vinyl siding in homes.
May 17, 2010	7 miles NE of Vinson, OR	Large hail	Walnut sized hail.
July 20, 2012	Near Meacham and Bingham Springs, OR	Large hail	Golf ball sized hail.
August 13, 2014	Near Kamela, OR	Large hail	Golf ball sized hail.
June 1, 20215	Near Kamela, OR	Large hail	Ping pong ball sized hail.
June 8, 2016	14 miles east of Mitchell, OR	Large hail	Golf ball sized hail with 70 mph winds.
Note	Umatilla County	Large hail	Around 20 occurrences of hail 1 inch or larger between Oct. 2006 – March 2020.
June 30, 2008	Ukiah, Pendleton, Meacham	Damaging Winds	Numerous reports of wind gusts 60-65 mph from Ukiah to Pendleton to Meacham. Trees and minor structural damage reported due to the winds.
July 30, 2010	Hermiston	Damaging Winds	64 mph wind gusts near Hermiston tore the roof off a barn and downed several trees.
March 13, 2011	Stanfield	Damaging Winds	70 mph gusts reported about 5 miles north of Stanfield. Shingles removed from the roof of a home and outbuildings destroyed.
July 8, 2012	Near Stanfield	Damaging Winds	80 mph gusts 3.5 miles SW of Stanfield. This destroyed outbuildings and damaged a section of irrigation equipment.
March 20, 2013	Pendleton, Milton-Freewater	Damaging Winds	Wind gusts ranging from 60-75 mph from Pendleton to Milton-Freewater. Numerous trees downed or snapped and minor structural damage in Milton-Freewater.
April 4, 2013	Weston	Damaging Winds	76 mph gust recorded at Weston.
September 15, 2013	Hermiston, Umatilla, Umapine, Pendleton	Damaging Winds	Widespread thunderstorms with wind gusts 60-70 mph from Hermiston and Umatilla to Pendleton and Umapine. Damage to trees, a blown over semi, and heavy blowing dust were all reported.
May 31, 2015	Pendleton	Damaging Winds	68 mph gust measured at Pendleton Airport. Trees uprooted and snapped in Pendleton.
October 14, 2016	Cayuse	Damaging Winds	78 mph wind gust at Cayuse.
June 26, 2017	Pendleton	Damaging Winds	64 mph wind gust measured at Pendleton Airport.
May 8, 2018	Adams	Damaging Winds	63 mph wind gust 4 miles west of Adams.
August 9, 2019	Pendleton	Damaging Winds	60 mph winds with damage to buildings 1.5 miles SW of Pendleton.
Note	Umatilla County	Damaging Winds	Around 80 to 90 occurrences between Oct. 2006–March 2020.
April 21, 2011	Milton-Freewater	Lightning	Lightning struck a home near Milton-Freewater, resulting in electrical damage.

Date	Location	Type of Severe Weather	Description
May 14, 2011	Pendleton	Lightning	Lightning struck two homes SW of Pendleton, resulting in damage to the homes.
Note	Umatilla County	Lightning	Two recorded occurrences between Oct. 2006-March 2020.
March 31, 2009	Umatilla County	Dust Storms	Strong non-thunderstorm winds across the Columbia Basin with wind gusts 60-75 mph lofted substantial amounts of dust, closing some major roadways. Damage to trees, power lines/poles, and some structures also occurred.
May 3, 2010	Umatilla County	Dust Storms	Strong non-thunderstorm winds across the Columbia Basin with wind gusts 55-65 lofted dust, causing accidents along I-84 and sporadic damage to trees and power lines/poles.
May 17, 2010	Holdman	Dust Storms	Thunderstorm driven dust storm near Holdman.
September 15, 2013	Umapine	Dust Storms	Thunderstorm driven dust storm near Umapine.
August 12, 2014	Lower Columbia Basin	Dust Storms	Thunderstorm driven dust storm over the Lower Columbia Basin.
November 17, 2015	Stanfield	Dust Storms	Dust storm triggered by strong non-thunderstorm winds lead to a pileup on I-84 near Stanfield and a fatality.
Note	Umatilla County	Dust Storms	A few occurrences between Oct. 2006-March 2020 due mainly to thunderstorms lofting dust.
December 14, 2006	Hermiston, Lexington, Umatilla	Non-thunderstorm Winds	Wind gusts 60-70 mph from Hermiston to Lexington to Umatilla.
January 4, 2008	Adams, Milton-Freewater	Non-thunderstorm Winds	Downslope wind storm along the foothills of the Blue Mountains with 60-70 mph wind gusts. Toppled semis and damage to trees and some buildings, especially in and around Adams and Milton-Freewater.
March 12, 2012	Ruggs, Long Creek	Non-thunderstorm Winds	Wind gusts 60-70 mph recorded at Ruggs and Long Creek.
December 12, 2012	Long Creek, Pendleton, Milton-Freewater	Non-thunderstorm Winds	Downslope wind storm with 60-70 mph SE winds along the foothills of the Blue Mountains. Sporadic damage from Long Creek to Pendleton to Milton-Freewater.
December 10, 2014	Foothills of Blue Mountains	Non-thunderstorm Winds	Downslope wind storm along the foothills of the Blue Mountains. Wind gusts ranging from 60-90 mph.
November 17, 2015	Stanfield	Non-thunderstorm Winds	Powerful winds across the Columbia Basin ranging from 60-80 mph. This triggered a dust storm near Stanfield that resulted in a fatality accident.
December 14, 2018	Milton-Freewater	Non-thunderstorm Winds	Downslope and mountain winds of 60-80 mph toppled a semi on I-84, closing the interstate in both directions. Portions of Hwy 11 to Milton-Freewater were also closed due to winds.
Note	Umatilla County	Non-thunderstorm Winds	A few occurrences of non-thunderstorm winds each year, especially foothills of the Blue Mountains, between Oct. 2006-March 2020.
December 25-26, 2008	Umatilla County	Winter Storms	Blizzard conditions in the Blue Mountains with 8-12 inches of snow and strong winds.
Non-specific	Tollgate, Meacham	Winter Storms	Multiple occurrences of 10-12+ inches of snow in the Blue Mountains including Tollgate, Meacham, etc.
Non-specific	Blue Mountain Foothills	Winter Storms	Multiple occurrences of 4-10 inches of snow in the Blue Mountain Foothills and adjacent Columbia Basin extent of Umatilla County.
Non-specific	Pendleton, La Grande	Winter Storms	Seasonal closures of I-84 from Pendleton to La Grande are common. At least 1-2 times per season on average.
Note	Umatilla County	Winter Storms	Winter storms including ice storms and blizzards, over 125 occurrences between Oct. 2006-March 2020.

Sources: *2014 Umatilla County NHMP*; Marcus Austin, NWS, personal communication, 4/27/20;

Table SS-6 includes storms that impacted larger geographic areas across Oregon.

Table SS-6 Significant Severe Summer Storms and Severe Winter Storms Across Oregon

Date	Location	Type of Severe Weather	Description
Dec. 1861	Statewide	Snow	Snowfall 1-3 inches. Snow in Willamette Valley until late February 1862.
Dec. 1892	Northern counties in OR	Snow	15-30 inches of snow fell throughout the northern counties.
Jan. 1916	Statewide	Snow	Two snow storms, each dropped 5 inches or more.
Dec. 1924	Statewide	Cold	Coldest December on record at that time. Drewsey and Riverside set a state record for the lowest temperature,-53 F.
Winter 1927, 1933, 1936, 1937, 1943, 1949	Portland area, W. Oregon, Statewide	Snow	Heavy snowfall. On January 20-25, 1927, the Harney Experiment Station reached -36 F. In February 1933, it was the coldest February to date for eastern Oregon. Ukiah and Seneca reached -54. Jan. 31 – Feb. 4 in 1937 had heavy snows statewide.
Apr. 1931	Western and central Oregon	Winter, wind, and dust storms	Unofficial wind speeds reported at 78 mph. Damaged fruit orchards and timber. Dust in the Santiam Canyon.
Mar. 1935	Central Oregon	Dust Storm	Dust storm reduced visibility to a few hundred yards over several counties. A fine county of dust on the fields and highways.
Jan. 1950	Statewide	Snow	Friday the 13th Storm. Heaviest snowfall since 1890. Freezing rain. Deep snowdrifts closed all highways west of the Cascades and through the Columbia Gorge. Roads and schools closed. Downed power lines. Severed communication. Hundreds of thousands of dollars in property damage.
Nov. 1951	Statewide	Winter and wind storm	Nov. 10-11. Widespread damage. Transmission and utility lines damaged. Wind speeds were 40-60 mph and gusts 75-80 mph.
Dec. 1951	Statewide	Winter and wind storm	Statewide storm with wind speeds 60 mph in Willamette Valley. Widespread damage to buildings and utility lines.
Dec. 1955	Statewide	Winter and wind storm	Wind speeds 55-65 with 69 mph gust. Considerable damage to buildings and utility lines.
Nov. 1958	Statewide	Wind storm	Wind speeds at 51 mph with 71 mph gusts. Every major highway blocked by fallen trees.
Winter 1956 1960, 1962	W. Oregon	Snow, ice	Packed snow became ice. Many auto accidents.
Mar. 1960	Statewide	Snow	Snowfall amounts were 3-12 inches depending on location.
Oct. 1962	Statewide	Winter storm	DR-136. 1962 Columbus Day Storm. Most severe windstorm for Western Oregon due to sustained wind speeds and damage levels. Winds in the Willamette Valley up to 116 mph. 84 homes destroyed, 5,000 severely damaged. Killed 38 people and created $170-200 million in damages in the state.
Dec. 1964	Statewide	Heavy rains and flooding	DR-184. Statewide event occurred on December 24, 1964.
Oct. 1967	W. Oregon	Winter storm	
Jan. 1969	Statewide	Snow	On January. 25-30 there was record-breaking snowfalls. $3 to $4 million in property damage.
Mar. 1971	Statewide	Winter storm	Great damage in the Willamette Valley; homes and power lines destroyed by falling trees.
Jan. 1972	W. Oregon	Storms and flooding	DR-319. Storm and flooding events on January 21, 1972.
Jan. 1974	W. Oregon	Rain on snow, flooding	DR-413. Flooding resulted from rain on snow events. Willamette River at Portland crested at 25.7 feet. Nine counties declared disasters.
Jan. 1980	Statewide	Winter storm	On January 9-11, there were a series of storms bringing snow, ice, wind, and freezing rain. Six fatalities.
Nov. 1981	Statewide	Winter storm	The strongest windstorm since the Columbus Day storm in 1962.
Feb. 1985	Statewide	Snow	Western valleys received 2-4 inches of snow. Massive power failures (tree limbs broke power lines). 2 feet of snow in northeast mountains. Event occurred on February 7-8.
Feb. 1986	Central and Eastern Oregon	Snow	Heavy snow in the Deschutes Basin and in eastern Oregon. Traffic accidents and broken power lines occurred.

Date	Location	Type of Severe Weather	Description
Mar. 1988	Statewide	Winter storm	Strong winds. Heavy snow.
Feb. 1989	Statewide	Winter storm	Heavy snowfall. Record low temperatures. Event occurred February 1-8.
Jan. 1990	Statewide	Winter storm	Heavy rain with winds greater than 75 mph; significant damage; 1 death. Event occurred January 6-8. Snow in Cascades.
Feb. 1990	Statewide	Snow	Average snowfall from one storm was 4 in. in the Willamette Valley. The storm brought 24-35 inches of snow to Cascade Locks and Hood River. Event occurred February 11-16.
Jan. 1991	Most of Oregon	Severe wind storm	Severe wind storm impacts. Event occurred January 11-12.
Mar. 1991	Mid-Columbia/ NE Oregon	Severe wind storm	Severe wind storm impacts.
Dec. 1991	N. Central OR	Severe wind storm	Blowing dust. Event occurred December 12.
Dec. 1992	W. Oregon	Snow and wind	Heavy snow. Interstate 5 closed. Northeastern mountains had severe wind.
Jan. 1993	Northern OR	Wind storm	Severe wind storm. Damage to utilities.
Feb. 1993	W. Oregon	Snow	Record snowfalls.
Nov. 1993	Cascade Mountains, OR	Snow	Heavy snow throughout the region.
Feb. 1994	Southeastern Oregon	Snow	Heavy snow throughout the region. Event occurred February 10.
Mar. 1994	Cascade Mountains, OR	Snow	Heavy snow throughout the region.
May 1994	Eastern Oregon	Wind storm	Strong winds in Treasure Valley area (Ontario); blowing dust caused car accidents. Event occurred May 15.
Dec. 1995	Statewide	Wind storm	DR-1107. Event occurred on December 10-12. Winds reached 62 mph in the Willamette Valley. Strongest windstorm since 1981.
Feb. 1996	Statewide	Storms, flooding, rain on snow	DR-1099. Winter storms with rain, snow, ice, floods, and landslides. Power outages, road closures and property damage. Warm temperatures, record breaking rains; extensive flooding in Multnomah County; widespread closures of major highways and secondary roads; 8 fatalities. 27 counties covered by the disaster declaration.
Dec. 1996	Statewide	Winter storm	DR-1160. Severe snow and ice. Up to 4 to 5 inches of ice in the Columbia Gorge. Interstate 84 closed for 4 days. Hundreds of downed trees and power lines.
Nov. 1997	W. Oregon	Wind storm	Uprooted trees. Considerable damage to small airports. Winds up to 52 mph.
Winter 1998-1999	Statewide	Snow	Series of storms. One of the snowiest winters in Oregon history. The snowfall at Crater Lake was 586 inches.
Feb. 2002	W. Oregon	Winter storm	Damages $6.14 million. Downed power lines and trees. Buildings damaged. Power outages caused some water supply problems.
Dec. 2003-Jan. 2004	Statewide	Snow and ice	DR-1510. Much of Portland area shut down. Twenty-six counties receive FEMA assistance.
Sep. 2005	Statewide	Evacuation	EM 3228. On September 7, there was a declaration for the Hurricane Katrina evacuation.
May 2006	Statewide	Storms, flooding, landslides, mudslides	DR-1632. Statewide impacts from storms, floods, landslides, and mudslides. The winds ranged from 70-80 mph.
Jul. 2006	Statewide	Heatwave	Multiple days of temperatures over 100 degrees Farenheit.
Nov. 2006	W. Oregon	Winter storm, flooding, landslides	DR-1962. The events occurred November 6-8, 2006.
Dec. 2007-Jan. 2008	W. Oregon	Winter storm	DR-1824. Severe winter storm, record and near record snow, landslides and mudslides. January 4 high winds in Harney Co. On January 8 there was 8 in snow across Harney Co. On January 29 there was 4-7 in snow near Burns.
Dec. 2008	Statewide	Winter storms, heavy rain, flooding	DR-1824. Severe winter storm, flooding, winds, record and near record snow, landslides and mudslides. Gresham received, 26” of snow. Many roads closed. Significant damages to public infrastructure, homes and businesses. Event occurred Dec. 20-26. On December 22, 2008, over 22 inches of snow fell on Hood River in 22 hours. Up to 6 inches

Date	Location	Type of Severe Weather	Description
			fell at Burns on December 21 and 60 in around Burns on December 25.
Dec. 2009	Statewide	Winter storm	Snow and freezing rain in Salem, and Portland to Hood River. I-84 closed for 22 hours. On December 14 there was 5 in snow across Harney County.
Nov. 2010	Statewide	Winter storm	Snow, freezing rain, and ice in Portland to Hood River. On November 21, Harney County had 4 in snow.
Jan. 2011	Statewide	Winter storm	DR-1956. Severe winter storm, flooding, mudslides, landslides, and debris flows.
Jan. 2012	W. Oregon	Winter storm	DR-4055. The incident period was January 12-21, 2012. Severe winter storm with flooding, landslides, and mudslides. Declaration involves 12 counties including Hood River County. Harney County had 5-8 in snow on January 24.
Dec. 2015	Western Oregon	Winter storm	DR-4258. Severe winter storms, straight-line winds, flooding, landslides, and mudslides.
Jan. 2017	Statewide	Severe winter storms, flooding, landslides, mudslides	DR-4238. The event occurred January 7-10, 2017. Counties that were part of the disaster declaration: Hood River, Columbia, Josephine, and Deschutes. Other counties were also greatly impacted by this and other storms that occurred.
Feb. 2019	W. Oregon	Severe winter storms, flooding, landslides, mudslides	DR-4432. February 23-23, 2019. Severe Winter Storms, Flooding, Landslides, and Mudslides. Declaration involves the counties of Jefferson, Lane, Douglas, Coos, and Curry.
Apr. 2019	Statewide	Severe winter storms, flooding, landslides, mudslides	DR-4452. April 6-21, 2019. Severe Storms, Flooding, Landslides, and Mudslides. Declaration involves the counties of Linn, Douglas, Curry, Umatilla, Wheeler, and Grant.
Feb. 2020	E. Oregon	Severe winter storms, flooding, landslides, mudslides	DR-4519. February 5-9, 2020. Severe Storms, Flooding, Landslides, and Mudslides. Declaration involves the counties of Umatilla, Wallowa, and Union and the Confederated Tribes of Umatilla Reservation Oregon.

Sources: *2014 Umatilla County NHMP*; DLCD, *2020 Oregon NHMP*; FEMA, Disaster Declarations for Oregon, retrieved 2021. Taylor and Hatton, 1999; NOAA Storm Events Database, http://www.ncdc.noaa.gov/stormevents/ (accessed 3/27/13).

Risk Assessment

How are Hazards Identified?

Wind storms in Umatilla County can occur in summer and winter; they usually occur from October to March. Their extent is determined by their track, intensity (the air pressure gradient they generate), and local terrain. The National Weather Service uses weather forecast models to predict oncoming windstorms, while monitoring storms with weather stations in protected valley locations throughout Oregon.[9] Thunderstorms can bring high winds during the warmer months, April to October. Tornadoes are the most violent of wind storms and are occasionally caused by intense local thunderstorms, which are more common during the warm season.

The magnitude or severity of severe winter storms is determined by a number of meteorological factors including the amount and extent of snow or ice, air temperature, wind speed, and event duration. Precipitation, an additional element of severe summer and severe winter storms, is measured by gauging stations. The National Weather Service in Pendleton monitors the stations and provides public warnings on storm, snow, and ice events as appropriate.[10] See Appendix B for more information on a broad spectrum of climate data for the four geographic areas in Umatilla County.

[9] National Weather Service, *Some of the Area's Windstorms*, https://www.wrh.noaa.gov/pqr/paststorms/wind.php

[10] National Weather Service Forecast Office, Boise, ID, https://www.weather.gov/boi/

Hazard Risk Analysis

The Umatilla County NHMP Steering Committee completed a Hazard Vulnerability Assessment/Analysis (HVA) during this NHMP update. This was described in Section 2 Risk Assessment. The method used for the HVA was developed from a Federal Emergency Management Agency (FEMA) tool that has been refined by the Oregon Office of Emergency Management (OEM). It addresses and weights (shown as percent within parentheses) probability (29%), vulnerability (21%), maximum threat (42%) and the history (8%) of each natural hazard and attributes a final hazard analysis score. The methodology produces scores that range from 24 to 240.

For local governments, conducting the HVA is a useful step in planning for hazard mitigation. The method provides the jurisdiction with a relative ranking from which to prioritize mitigation actions, but does not predict the occurrence of a particular hazard.

A recap of the changes for the severe summer storms and the severe winter storms hazards between the HVA done for the *2014 Umatilla County NHMP* and the one done for the *2021 Umatilla County NHMP*: In the *2014 Umatilla County NHMP*, severe summer storms and severe winter storms were not ranked specifically but were included as part of weather emergencies. Weather emergencies were ranked first in the *2014 Umatilla County NHMP*. In the *2021 Umatilla County NHMP*, severe summer storms are ranked third and severe winter storms are ranked fourth out of nine hazards (removed weather emergencies and added air quality). For more information on all the risk scores and ranks of the natural hazards for Umatilla County, see Volume I Basic Plan, Section 2 Risk Assessment of this NHMP.

Probability of Future Occurrence

The hazard history section details numerous severe summer and severe winter storm events affecting Umatilla County, the Cities, and the Special Districts since 1861. Some of the report incidents are localized events that do not affect large areas of the County or Cities. Specific probability rates have not been calculated for each of these hazards in Umatilla County.

The Umatilla County NHMP Steering Committee, during the HVA on October 27, 2020, scored both severe summer storms and severe winter storms with a probability of 10. Probability was one of the four weighted factors in the HVA used to calculate the overall risk score. The probability scale used in the HVA identified the scores of 8 to 10 as high, defined as likely to occur within the next 5 years. For additional description of the HVA scoring, see Volume I Section 2 Risk Assessment.

Extreme weather events are experienced in all regions of Oregon. The regions that experience the highest wind speeds are in the Oregon Coast of Region 1 and Mid-Columbia in Region 5. Umatilla County is in Region 5. See Table SS-6, the Probability of Severe Wind Events by Natural Hazard Region. The table shows the wind speed probability intervals that structures 33 feet above the ground would expect to be exposed to within a 25-, 50- and 100- year period.

Table SS-6 Probability of Severe Wind Events by Natural Hazard Region

	25-Year Event (4% annual probability)	50-Year Event (2% annual probability)	100-Year Event (1% annual probability)
Region 1: Oregon Coast	75 mph	80 mph	90 mph
Region 2: North Willamette Valley	65 mph	72 mph	80 mph
Region 3: Mid/Southern Willamette Valley	60 mph	68 mph	75 mph
Region 4: Southwest Oregon	60 mph	70 mph	80 mph
Region 5: Mid-Columbia	75 mph	80 mph	90 mph
Region 6: Central Oregon	60 mph	65 mph	75 mph
Region 7: Northeast Oregon	70 mph	80 mph	90 mph
Region 8: Southeast Oregon	55 mph	65 mph	75 mph

Source: DLCD, *2015 Oregon Natural Hazard Mitigation Plan*, https://www.oregon.gov/LCD/NH/Documents/Approved_2015ORNHMP_5_RAState.pdf

Vulnerability Assessment

Storms and weather information are tracked by numerous agencies such as NOAA/National Weather Service (NWS), USGS, Oregon Climate Services, ODOT, and DOGAMI, and warnings are issued by NWS when certain thresholds are reached. The impacts of severe summer and severe winter storms happen at a range of levels. Communities are vulnerable in many ways such as emergency services may be challenged to respond, critical facilities may be damaged, and economic vitality may be impacted.

Wind storms can cause power outages, transportation, and economic disruptions. Structures most vulnerable to high winds in Umatilla County include insufficiently-anchored manufactured homes and older buildings with roof structures not designed for anticipated wind loads. Fallen trees and debris are common and can block roads for long periods, in addition to bringing down power and/or utility lines. To identify wind speeds and the effects, see Figure SS-7, Effects of Wind Speed.

Manufactured homes, multi-story retirement homes, and buildings in need of roof repair are structures that may be most vulnerable to wind storms. Buildings adjacent to open fields or adjacent to trees are also more vulnerable to wind storms than more protected structures.

Thunderstorms can occur with high winds. When they come with hail they are predominantly an economic concern for the County's agricultural community. If a storm occurs or a lightning strike happens during the growing season, damages to row crops can be economically devastating, especially to the uninsured. Microbursts have damaged buildings and have contributed to instances of several inches of rain falling in an hour or less. Severe thunderstorms occurring after a recent

wildfire can wash out canals and waterways stripped of undergrowth by fire, which then exacerbate flood issues and can damage roads and irrigation infrastructure.

Table SS-7 Effects of Wind Speed

Wind Speed (mph)	Wind Effects
25-31	Large branches will be in motion.
32-38	Whole trees in motion; inconvenience felt walking against the wind.
39-54	Twids and small branches may break off trees; wind generally impedes progress when walking; high profile vehicles such as trucks and motor homes may be difficult to control.
55-74	Potential damage to TV antennae; may push over shallow rooted trees, especially if the soil is saturated.
75-95	Potential for minimal structural damge, particularly to unanchored mobile homes; power lines, and signs; and tree branches may be blown down.
96-110	Moderate structural damage to walls, roofs, and windows; large signs and tree branches blown down; moving vehicles pushed off roads.
111-130	Extensive structural damage to walls, roofs, and windows; trees blow down; mobile homes may be destroyed.
131-155	Extreme damage to structures and roofs; trees uprooted or snapped.
Greater than 155	Catastrophic damage; structures destroyed.

Source: Washington County, Office of Consolidated Emergency Mngt, Wind Effects.

Snow and ice storms can block traffic; cause traffic accidents and block roads; damage crops, livestock, and agricultural buildings; and delay transportation of products. People may be stranded. Events and activities may be cancelled. Power outages and downed trees can happen. Extreme cold can cause bodies to work harder to maintain themselves which stresses them and cause injury. Accidents can occur.

All of these cause economic disruptions, and pose a high risk for injuries and loss of life. The events can also be typified by a need to shelter and care for adversely impacted individuals.

Community Hazard Issues

What is susceptible to damage during a severe summer storm event?

The damaging effects of wind storms may extend for distances of 100 to 300 miles from the center of storm activity. Positive wind pressure is a direct and frontal assault on a structure, pushing walls, doors, and windows inward. Negative pressure also affects the sides and roof: passing currents create lift and suction forces that act to pull building components and surfaces outward. The effects of winds are magnified in the upper levels of multi-story structures. As positive and negative forces impact and remove the building protective envelope (doors, windows, and walls), internal pressures rise and result in roof or leeward building component failures and considerable structural damage. As has been stated manufactured homes, multi-story retirement homes, and buildings in need of roof repair are structures that may be most vulnerable to wind storms. Buildings adjacent to open fields or adjacent to trees are also more vulnerable to wind storms than more protected structures.

Wind storms can result in collapsed or damaged buildings, damaged or blocked roads and bridges, damaged traffic signals, streetlights, and parks. Roads blocked by fallen trees during a wind storm may have severe consequences to people who need access to emergency services. Emergency response operations can be complicated when roads are blocked or when power supplies are interrupted. Wind storms can cause flying debris which can also damage utility lines. Overhead power lines can be damaged even in relatively minor wind storm events. Industry and commerce can suffer losses from interruptions in electric service and from extended road closures. They can also sustain direct losses to buildings, personnel, and other vital equipment. There are direct consequences to the local economy resulting from wind storms related to both physical damages and interrupted services.

What is susceptible to damage during a severe winter storm event?

Severe winter weather can be a deceptive killer. Winter storms which bring snow, ice, and high winds can cause significant impacts on life and property. Many severe winter storm deaths occur as a result of traffic accidents on icy roads, heart attacks which shoveling snow, and hypothermia from prolonged exposure to the cold. The temporary loss of home heating can be particularly hard on the elderly, young children, and other vulnerable individuals.

Property is at risk due to flooding and landslides that may result if there is a heavy snowmelt. Additionally, ice, wind and snow can affect the stability of trees, power and telephone lines and TV and radio antennas. Down trees and limbs can become major hazards for houses, cars, utilities and other property. Such damage in turn can become major obstacles to providing critical emergency response, police, fire and other disaster recovery services.

Ice storms occur on a frequent basis and cause significant damage, especially to local utilities. Severe winter weather also can cause the temporary closure of key roads and highways, air and train operations, businesses, schools, government offices and other important community services. Below freezing temperatures can also lead to breaks in un-insulated water lines serving schools, businesses, and industry and individual homes. Severe winter storms can isolate small communities, farms, and ranches and create serious problems for open range cattle operations. Early and late season extreme cold can damage agricultural crops, while snow and ice can block access for the distribution of crops and provision of agricultural services. All of these effects, if lasting more than several days, can create significant economic impacts for communities as well for the surrounding region, and even outside of Oregon.

Existing Mitigation Activities and Resources

Existing mitigation activities include current mitigation programs and activities that are being implemented by the community in an effort to reduce the community's overall risk to natural hazards. Documenting these efforts can assist the community in better understanding its risk and can assist in documenting successes.

Agriculture[11]

Conservation Reserve Program (CRP)

CRP is a federal program that converts eligible cropland from agricultural production and plants the land to permanent grass cover that reduces erosion and benefits wildlife populations. CRP establishes permanent cover that reduces windblown dust and has been effective in reducing soil erosion in the areas most prone to wind erosion. In Umatilla County, NRCS has designated an area near I-84 as a wind erosion priority area to influence enrollment into the Conservation Reserve Program (CRP).

No-Till Cropping

SWCDs have been actively promoting direct seeding technology through education and incentives. Direct seeding or no-till cropping systems utilize technologically advanced equipment that places seed and fertilizer into undisturbed soil and residue from the previous crop. This results in minimal soil disturbance and reduced potential for wind and water erosion. Research on the Columbia Plateau has demonstrated that continuous annual no-till cropping can significantly reduce predicted dust emissions during severe winds.

The research shows that continuous annual no-till cropping can reduce predicted dust emissions by 94% during severe wind events, compared to conventional wheat-fallow. Research continues on measuring dust emissions from fields on the Columbia Plateau, a 50,000 square-mile region in Washington, Oregon, and Idaho containing one of the driest, yet most productive, rain-fed wheat regions in the world. No-till only works for some crops under certain conditions and even in situations where it does work, some farmers find that they need to till the soil periodically to reduce diseases and redistribute soil moisture.

Wind Erosion Hazard Index

Representatives from the Agricultural Research Service, located at the Columbia Plateau Conservation Research Center in Pendleton, collaborated with the staff from the National Weather Service to develop a wind erosion hazard index to improve dust storm prediction models used in forecasting weather conditions that could lead to dust storms. In the future, this information could lead to a more advanced warning system for the public and emergency responders.

State Natural Hazard Risk Assessment

The risk assessment in the *2020 Oregon Natural Hazards Mitigation Plan* provides an overview of all the identified natural hazards in Oregon (in the State NHMP but not necessarily all the locally identified natural hazards) and identifies the most significant hazards in Oregon's recorded history. It has overall state and regional information, and includes mitigation actions for the entire state. https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_11_RA5.pdf

Planning for Natural Hazards: Oregon Technical Resource Guide

This guide describes basic mitigation strategies and resources related to natural hazards, including examples from communities in Oregon. https://scholarsbank.uoregon.edu/xmlui/handle/1794/1909

[11] *2014 Umatilla County NHMP*. The agriculture information from the *2014 Umatilla County NHMP* is retained here.

Oregon State Building Code Standards

The Oregon Building Codes Division adopts statewide standards for building construction that are administered by the state and local municipalities throughout Oregon. The *2017 Oregon Residential Special Code* (*ORSC*) contains requirements for one- and two-family dwellings (https://codes.iccsafe.org/content/document/1018?site_type=public) and the *2019 Oregon Structural Special Code* (*OSSC*) (https://codes.iccsafe.org/content/OSSC2019P1) contains provisions for grading and site preparation for the construction of building foundations.

Street/ Road/ Highway Maintenance[12]

The Oregon Department of Transportation (ODOT) is responsible for performing precautionary measures to maintain the safety and operability of major roads during winter storm conditions. The road maintenance programs are designed to provide the best use of limited resources to maximize the movement of traffic within the community during winter weather.

During storm events, most agencies at the county and city level focus on clearing major arterial and collector streets first, and then respond to residential connector streets, school zones, transit routes, and steep residential streets as resources become available. The state, counties, and cities, may have agreements, including mutual aid agreements, about road maintenance responsibilities during day to day operations and who does what in storm situations. In general, highways receive more attention. Routes on the National Highway System network, primary interstate expressways and primary roads, will be cleared more quickly and completely than other roads.

Real-Time Video 105

ODOT has installed a microwave system and roadside camera tower near the Lorenzen Road Interchange ten miles west of Pendleton. The microwave and camera structures are located south of the freeway, opposite the Rew Grain Elevator. Two cameras are currently mounted on a metal tower next to the microwave tower. One provides a snapshot of the freeway and is posted on the "Trip Check" Web site. The other viewed by ODOT District 12 office personnel only. A weather station and visibility meter have also been added to the camera tower to monitor blowing dust conditions during high winds. The real-time camera can be panned and tilted to check eastbound and westbound traffic as well as scan the nearby fields.

ODOT Highway Advisory Radio

Three transmitters have been installed for Highway Advisory Radio along Interstate 84 in Morrow and Umatilla counties: one at the Boardman Safety Rest Area, another at the District 12 maintenance station, and the third near Mission. When an emergency occurs, the ODOT District 12 office selects the appropriate pre-recorded message on the system and transmits it via radio. At the same time, ODOT activates yellow flashing beacons. Motorists seeing the signs and flashing lights can tune to the appropriate radio station to hear the messages. Also installed in the system is the ability to re-broadcast National Weather Service (NWS) weather information. NWS Weather Radio is re-broadcast on a continuous basis unless there is an emergency. An emergency broadcast then overrides the Weather Radio service.

[12] *2014 Umatilla County NHMP*. The agriculture information from the *2014 Umatilla County NHMP* is retained here.

Restricted Access to Interstate 84 during Hazardous Conditions

ODOT has installed six gates within Umatilla County for I-84 closures. The gates were funded by the Chemical Stockpile Emergency Preparedness Program (CSEPP).

Table SS-8 I-84 Road Closure Gates

I-84 Exit Number	Location	Direction EB= Eastbound WB= Westbound
159	Tower Road	Both directions
165	Port of Morrow	Both directions
188	Hwy 395 at Stanfield	Both directions
193	Echo Road	Both directions
202	Barnhart Road	WB only
216	Hwy 331	EB only

Source: *2014 Umatilla County NHMP*

State and local law enforcement officers and ODOT highway workers can close the gates, restricting access to I-84 due to hazardous dust conditions or other situations that make highway travel dangerous.

Wind Storm

Oregon Building Codes (both residential and other codes) set standards to withstand 80 mph winds (https://www.oregon.gov/bcd/codes-stand/pages/index.aspx).

FEMA recommends having a safe room in homes or small businesses to prevent residents and workers from "dangerous forces" of extreme winds to avoid injury or death. (https://www.fema.gov/fema-p-320-taking-shelter-storm-building-safe-room-your-home-or-small-business).

Existing strategies and programs at the state level are usually performed by the Oregon Public Utility Commission (OPUC), Building Code Division (BCD), Oregon Department of Forestry (ODF), Oregon Emergency Management (OEM), and the Oregon Department of Transportation (ODOT).

The Oregon Emergency Response System (OERS) coordinates and manages state resources in response to natural and technological emergencies and civil unrest involving multi-jurisdictional cooperation between all levels of government and the private sector (https://www.oregon.gov/oem/emops/Pages/OERS.aspx).

OPUC ensures operators manage, construct and maintain their utility lines and equipment in a safe and reliable manner. These standards are listed on this website: http://www.puc.state.or.us/PUC/safety/index.shtml. OPUC promotes public education and requires utilities to maintain adequate tree and vegetation clearances from high voltage utility lines and equipment.

Winter Storm

Studded tires can be used in Oregon from November 1 to April 1. They are defined under Oregon law as a type of traction tire. Research shows that studded tires are more effective than all-weather

tires on icy roads, but can be less effective in most other conditions. Winter storm is similar to wind storm in terms of strategies and programs at the state level.

Emergency Operations Plans

Umatilla County Emergency Management (UCEM) coordinates with NOAA NWS when notices may be required to inform response agencies and the general public of potential emergency events. UCEM response and coordination is outlined in the Umatilla County *Emergency Operations Plan* and usually involves disseminating materials addressing shelter locations, response contact information and other information. Should an emergency event become severe, UCEM is can activate the Emergency Operations Center (EOC) and Joint Information Center (JIC) to emergency response, evacuation and the dissemination of important public safety information.[13]

The *Umatilla County EOP*, dated January 2012 (ordinance 2012-01 passed 1/18/12), is an all-hazard plan that describes how Umatilla County will organize and respond to emergencies and disasters in the community. It is based on, and is consistent with Federal, State of Oregon, and other applicable laws, regulations, plans, and policies, including the National Response Framework, and State of Oregon Emergency Operations Plan. The *Umatilla County EOP* is one component of the County's emergency management program and is designed to be compliant with the National Incident Management System.

The *Umatilla County EOP* consists of a Basic Plan, Emergency Support Function Annexes that complement the Federal and State Emergency Support Functions, Support Annexes, and Incident Annexes. It provides a framework for coordinated response and recovery activities during an emergency. It describes how agencies and organizations in Umatilla County will coordinate resources and activities with other Federal, State, local, tribal, and private-sector partners.[14] The *Umatilla County EOP* includes severe weather (including landslides) as a hazard.

Umatilla County Emergency Operations Plan, http://www.co.umatilla.or.us/bcc/codes/35.pdf

Future Changing Conditions/ Climate Change

In the *2021 Umatilla County NHMP*, there are several locations that describe future changing conditions or climate change as it relates to the natural hazards that impact Umatilla County and the cities. In the order of appearance in the NHMP: the Risk Assessment, the Hazards Annexes, and Appendix E contain this information. Within Appendix E there are two documents, the *Future Climate Projections: Umatilla County* and the *Climate Change Two-Pager*.

Severe Summer Storms and Severe Winter Storms Mitigation Actions

The severe summer storms and severe winter storms mitigation actions (SS) have been identified by the Umatilla County NHMP Steering Committee. See Table 3-1, 2021 Umatilla County NHMP Mitigation Actions for Umatilla County. In discussion with the NHMP Steering Committee, it was

[13] *2014 Umatilla County NHMP*, May 2015

[14] Ecology and Environment, Inc., *Umatilla County Emergency Operations Plan*, January 2012.

agreed that the risk level rankings from the HVA would be used as the way to prioritize the multi-hazard and hazard-specific mitigation actions. The risk level rankings are in Table 2-4 in Section 2 Risk Assessment.

There are six SS specific mitigation actions. The SS mitigation actions have a high priority because the Hazard Vulnerability Assessment (HVA) resulted in both severe summer storms and severe winter storms having a high risk level. There are multi-hazard mitigation actions for the NHMP and several of those include severe summer storms and severe winter storms related mitigation actions, in conjunction with the other hazards. The multi-hazard mitigation actions are a high priority.

WILDFIRE HAZARD ANNEX

Risk Score: 203

Risk Level: High

Causes and Characteristics of Wildfire

A wildfire is a strong and often uncontrollable burning of forest, brush, or rangeland (includes grassland). Fire has always been a part of high desert Western ecosystems and can have both beneficial and devastating effects. Eastern Oregon has a lengthy history (see Table WF-1 Significant Historic Wildfires) of wildfire in both wildlands and in wildland-urban interface (WUI) areas. WUI areas are where the human developed areas meet the undeveloped areas; it is a transition area. Other areas that are less forested or are covered by brush and grassland also create susceptibility to wildfire. As the population in this region grows, development in the WUI increases, posing a larger threat to life and property.

Wildfire was ranked second in the *2014 Umatilla County NHMP*. In the *2021 Umatilla County NHMP* it is ranked fifth out of nine hazards (removed weather emergencies and added air quality).

Nearly 3,700 sq. mi. or 2.4 million acres are considered WUI areas in Oregon, which is about 3.8% of the state. Of the nearly 1.7 million total homes in Oregon, over 603,000 or 36%, are in the WUI.[1]

Wildfires threaten the limited but valued forestland, agricultural land and rangelands, and individual home sites. Wildland firefighting agencies protect forest and rangeland from wildland fires. While they fight to protect structures from fires spreading from the wildlands, they do not fight fires once they become structural and equipment fires. Notably, once a fire has started, homes and development in wildland and WUI settings complicate firefighting activities and stretch available human and equipment resources.[2]

The loss of property and life, however, can be minimized through cooperation, preparedness, and mitigation activities. Federal agencies with wildland firefighting responsibilities mainly protect federal ownership, while state wildland firefighting agencies protect private forestland along with other public ownership. Both state and federal wildland firefighters can provide wildfire suppression service outside their respective jurisdictions through formal agreements. There are also Rural Fire Districts that have both structural and wildland responsibilities in the more populated (unincorporated) areas and there are Rangeland Fire Protection Associations (RFPA) that provide wildland fire protection on the private rangelands Umatilla County. There are many agreements between local, state, and federal organizations to assist one another throughout Umatilla County.

Communities located in areas near rangeland or forests or a WUI may be at risk to wildfire hazards.

Wildfire information included in this *2021 Umatilla County NHMP* includes but is not limited to the three *Umatilla County Community Wildfire Protection Plans* described here and included in Appendix I, information from the BLM and ODF, information from the Oregon Wildfire Explorer and

[1] Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21

[2] Al Crouch, BLM, personal communication, March 4, 2019.

information from Umatilla County GIS. The two climate change documents in Appendix E Future Climate Projections Report and the *2014 Umatilla County NHMP* also provide information.

To reduce the impact of wildfire, Umatilla County has three Community Wildfire Protection Plans (CWPP): the *West County CWPP* (2006), the *Blue Mountains and Foothills Region CWPP* (2005), and the *Mill Creek and Walla Walla County CWPP* (2017).

The CWPPs provide detailed information on the vulnerability and history of wildfire in the County, and provide mitigation actions Umatilla County and Cities can implement to reduce the impact of wildfire. This *2021 Umatilla County NHMP* links to the CWPPs as it also contains wildfire information and mitigation actions. See Table 3-1, Umatilla County NHMP Mitigation Actions. The CWPPs are included as part of the *2021 Umatilla County NHMP* and are in Appendix I.

The 2005 *Blue Mountains and Foothills Region CWPP* describes that the project area for the CWPP encompasses the eastern and southern portions of Umatilla County (the Blue Mountains and Foothills Region). The remainder of the areas in Umatilla County are covered by other CWPPs.

In the *2005 Blue Mountains and Foothills Region CWPP*, it describes that the "communities that are most at risk from a wildfire event were identified and prioritized based on public input, local area knowledge of the committee, and an assessment of hazard factors using federal and non-federal data."[3] The thirteen communities are listed in Table WF-1.

Table WF-1 Communities in Umatilla County Most at Risk from a Wildfire Event as Designated by the 2005 Blue Mountains and Foothills Region CWPP

Community	Priority
I-84	High
Battle Mountain	High
Lehman/Hidaway	High
Weston Mountain/Umatilla River	High
Mill Creek/ Government Mountain	High
Upper 204/Tollgate	Moderate
Pine Grove	Moderate
Camas	Moderate
Ukiah	Moderate
Birch	Moderate
Pearson Guard Station	Moderate
McKay	Moderate
Walla Walla River	Low

Source: *2005 Blue Mountains and Foothills Region Community Wildfire Protection Plan (CWPP)*, http://www.co.umatilla.or.us/planning/pdf/NHMP/cwpp_umatilla.pdf

[3] *2005 Blue Mountains and Foothills Region Community Wildfire Protection Plan (CWPP)*, http://www.co.umatilla.or.us/planning/pdf/NHMP/cwpp_umatilla.pdf

In the *2006 West County CWPP*, there are fourteen communities listed as priority for addressing wildfire risk. These are identified in Table WF-2.

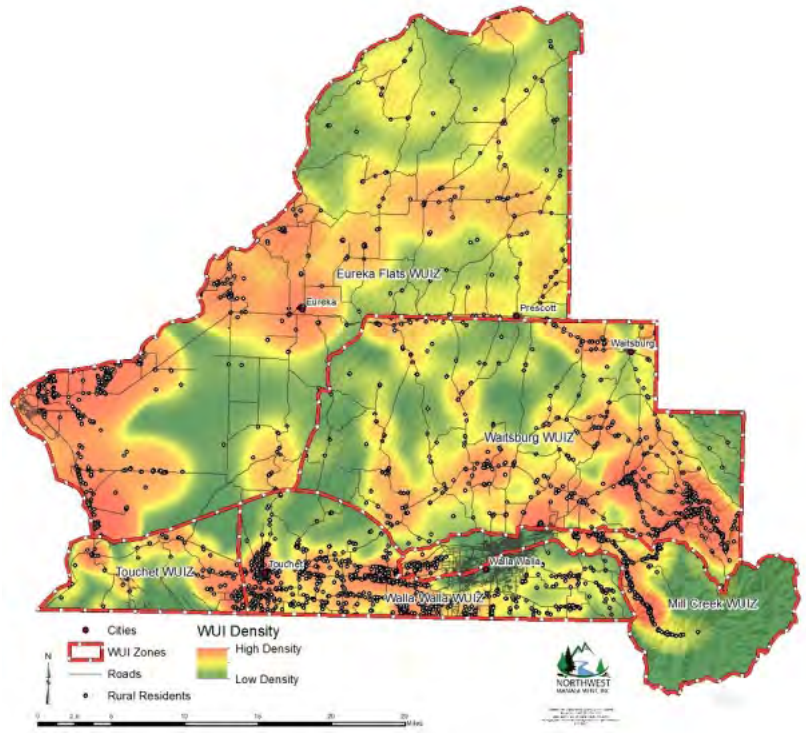
Table WF-2 Communities in Umatilla County Most at Risk from a Wildfire Event as Designated by the 2006 West County CWPP

Community	Priority
Juniper Canyon	High
Pendleton	High
Stanfield	High
South Shore	High
Echo	High
Rieth	High
Hermiston	High
Helix	High
Mission	High
Pilot Rock	High
Milton-Freewater	High
Umatilla Depot	Moderate
Umapine	Moderate
Highway 11 Corridor	Moderate

Source: *2006 West County Community Wildfire Protection Plan (CWPP)*, http://www.co.umatilla.or.us/planning/pdf/NHMP/CWPP_WestCounty.pdf

The *2017 Mill Creek and Walla Walla County CWPP* describes the wildfire risk with communities and the related Wildland Urban Interface Zones (WUIZ): Eureka Flats WUIZ, Mill Creek WUIZ, Walla Walla WUIZ, Touchet WUIZ, and the Waitsburg WUIZ. These are shown in Figure WF-1.

Figure WF-1 Wildland Urban Interface, Based on Individual WUI Zone



Source: 2017 Mill Creek and Walla Walla County CWPP, Microsoft Word - Walla Walla County CWPP FINAL.docx (walla-walla.wa.us)

The impact on communities from wildfire can be huge and has been estimated at 3 times the cost of suppression.[4] Statewide in 2018, according to the Northwest Interagency Coordination Center, the cost of fighting wildfires in Oregon was $514.6 million, which was a substantial increase from the $447 million it cost in 2017.[5] Wildfires in Umatilla County affect other counties. The History of Wildfires in Umatilla County section in this Wildfire Hazard Annex includes a description of documented wildfires in Umatilla County in Table WF-3; not all the wildfires that have occurred in Umatilla County are included on this list. Two additional tables, WF-4 and WF-5, previously included in the 2014 Umatilla County NHMP, provide additional historic information on wildfires.

See Figures WF-12 through WF-20 for countywide maps illustrating wildfire hazards In Umatilla County. The Umatilla County GIS Planner created these maps with wildfire information for this *2021 Umatilla County NHMP*. Each map identifies the source of the information used and are included at the end of this Hazard Annex. Additional details about the maps and data in them is included in Appendix F Umatilla County NHMP Hazards Maps Details.

- Figure WF-12 Umatilla County Wildfire Hazard: Umatilla County Fire Protection Districts
- Figure WF-13 Umatilla County Community Wildfire Protection Plan (CWPP) Areas within Umatilla County
- Figure WF-14 Umatilla County Wildfire Hazard: Wildfire History

[4] Dustin Gustaveson, ODF, personal communication, 2/24/20

[5] Salem Statesmen-Journal, *Oregon Wildfire Costs Hit Record High of $514 million in 2018*, October 10, 2018, https://www.statesmanjournal.com/story/news/2018/10/10/oregon-wildfire-costs-hit-record-high-2018/1581132002/.

- Figure WF-15 Umatilla County Wildfire Hazard: Burn Probability
- Figure WF-16 Umatilla County Wildfire Hazard: Wildfire Risk to Property and People
- Figure WF-17 Umatilla County Wildfire Hazard: Risk to Assets
- Figure WF-18 Umatilla County Wildfire Hazard: Overall Wildfire Risk
- Figure WF-19 Umatilla County Wildfire Hazard: Wildfire Smoke Sensitivity
- Figure WF-20 Umatilla County Wildfire Hazard: Wildfire Weather Zones

Wildfire can be divided into four categories: interface fires, wildland fires, firestorms, and prescribed fires.[6] These descriptions are provided for a brief but comprehensive understanding of wildfire.

Interface Fires

An interface fire occurs where wildland and developed areas come together with both vegetation and structural development combining to provide fuel. The WUI can be divided into categories.

- The **classic wildland-urban interface** exists where well-defined urban and suburban development presses up against open expanses of wildland areas.

- The **mixed wildland-urban interface** is more typical of the problems in areas of exurban or rural development: isolated homes, subdivisions, resorts and small communities situated in predominantly in wildland settings.

- The **occluded wildland-urban interface** where islands of wildland vegetation exist within a largely urbanized area.[7]

Wildland Fires

A wildland fire's main fuel source is natural vegetation. Often referred to as forest or rangeland fires, these fires occur in national forests and parks, private timberland, and on public and private rangeland. A wildland fire can become an interface fire if it encroaches on developed areas.

Firestorms and Mega-Fires

A firestorm is a very intense and destructive fire usually accompanied by high winds; it may be a large fire that is difficult to impossible to control. [8] Firestorms are events of such extreme intensity that effective suppression is virtually impossible. Firestorms often occur during dry, windy weather and generally burn until conditions change or the available fuel is consumed.

In 1987, widespread dry lightning in late August ignited fires throughout northern California and southwest Oregon. Two of these were over 10,000 acres, and according to the Oregon Department of Forestry, this series of events fits the definition of a firestorm. Resources were brought in from other states and Canada to fight them.[9] Another term of use is mega-fire which is a fire that is more

[6] Federal Emergency Management Agency, *Multi-hazard, Identification and Risk Assessment Report*, 1997, Washington, D.C., https://www.fema.gov/media-library/assets/documents/7251.

[7] Ibid.

[8] Definition of firestorm, Merriam-Webster Dictionary, https://www.merriam-webster.com/dictionary/firestorm and Cambridge Dictionary, https://dictionary.cambridge.org/us/dictionary/english/firestorm.

[9] Wolf, Jim, ODF, personal communication, May 8, 2001.

than 100,000 acres in size.[10] There are fires greater than 100,000 acres listed in Table WF-3, but none of them occurred in Umatilla County. Fires outside of Umatilla County are included in the table to demonstrate that large or mega-fire wildfires can and do occur in Oregon. Fires in abutting or nearby counties can have substantial impacts on Umatilla County.

Prescribed Fires

Prescribed fires are intentionally set or are select natural fires that are allowed to burn for beneficial purposes. Before humans suppressed forest fires, small, low intensity fires cleaned the underbrush and fallen plant material from the forest floor while allowing the larger plants and trees to live through the blaze. These fires were only a few inches to two feet tall and burned slowly. Forest managers now realize that a hundred years of prevention and suppression has contributed to the unnatural buildup of plant material that can flare up into tall, fast moving wildfires. These can be impossible to control and can leave a homeowner little time to react.

Conditions Contributing to Wildfires

Ignition of a wildfire may occur naturally from lightning or from human causes such as debris burns, arson, careless smoking, recreational activities, equipment, or an industrial accident. According to BLM staff in Harney County stated that over the long term approximately 20% of fires are caused by humans. This statistic is transferable to other counties in Oregon.[11] Many of the equipment caused fires occur as a result of transportation or creation.[12] See Figure WF-14 for a map of fire locations. As noted above, there are numerous maps included in this Wildfire Annex.

Additional data provided by the BLM shows some variability and uncertainty in the identification of the cause of fire starts. BLM staff noted that some of the human starts are under investigation until legal issues are resolved. So while those fires are under investigation, they are placed in the unknown category of fire starts.

Once started, four main conditions affect the fire's behavior: fuel, topography, weather and development. Of note, a fire's flame length is commonly used as a visual indication of fire intensity, and is a primary factor to consider for firefighter safety and for gauging potential impacts to resources and assets. A higher flame length may indicate a higher fire intensity, and a lower flame length may indicate a lower fire intensity. A more detailed discussion of flame length and fire intensities is better suited to the CWPP than the NHMP. Fire conditions, which affect the fire's behavior, vary widely with topography, fuels, and weather – especially winds.

Fuel

Fuel is the material that feeds a fire. Fuel is classified by volume and type. Forested lands provide a larger fuel source to wildfires than other vegetated lands due to the presence of large amounts of timber and other dense vegetation in these areas. Grassland are included in the rangeland areas[13] Grasslands, which naturally cover much of the region, are highly susceptible to wildfire. According to

[10] Casey O'Connor, BLM, personal communication, July 29, 2019.

[11] Casey O'Connor, BLM, personal communication, July 29, 2019.

[12] Al Crouch, BLM, personal communication, March 4, 2019.

[13] Ibid.

BLM staff, there is an increasing amount of invasive grasses in the grasslands; these invasive grasses are more susceptible to burn. The variability of the fire likelihood is great, as the factors of soil moisture, soil temperature, and amount of and nature of grass there varies. Vegetation such as agricultural lands and rangelands also provides fuel for wildfires.[14] Many agencies are finding it cheaper and more effective to reduce fuels than to fight large grassland or rangeland fires.

Topography

Topography influences the movement of air and directs a fire's course. Slope and hillsides are key factors in fire behavior. Hillsides with steep topographic characteristics are often also desirable areas for residential development. In this region, much of the topography is hilly or mountainous which can exacerbate wildfire hazards. These areas can cause a wildfire to spread rapidly and burn larger areas in a shorter period of time, especially, if the fire starts at the bottom of a slope and migrates uphill as it burns. Wildfires tend to burn more slowly on flatter lying areas, but this does not mean these areas are exempt from a rapidly spreading fire. Hazards that can affect these areas after the fire has been extinguished include landslides (debris flows), floods, and erosion.

Weather

Weather is the most variable factor affecting wildfire behavior. High-risk areas in Oregon share a hot, dry season in late summer and early fall with high temperatures and low humidity. During the HVA discussions with the Umatilla County NHMP Steering Committee, several members noted the microclimates in Umatilla County. Recognition of the variability of the weather and climate in Umatilla County is important for identifying and accomplishing efforts to mitigate wildfire and other natural hazards. In the Severe Summer Storms and Severe Winter Storms Hazard Annex, Tables SS-1 and SS-2 shows the average annual precipitation in Hermiston and Tables SS-3 and SS-4 shows the average annual precipitation in Ukiah. Additional weather information is described in Appendix B Community Profile.

The natural ignition of wildfires is largely a function of weather and fuel; human caused fires add another dimension to the probability. Lightning strikes in areas of forest or rangeland combined with any type of vegetative fuel source will always remain as a source for wildfire. Thousands of lightning strikes occur each year throughout much of the region. Fortunately, not every lightning strike causes a wildfire, though they are a major contributor. Figure WF-14 Wildfire History shows the fire locations from 1992-2019 for fire locations of fires managed by ODF. It also shows the fire locations of fires managed by local fire districts from 2003 to August 2020. The map does not show fire locations with the cause of the fire (e.g. human or lightning).

Development

The increase in residential development in interface areas has resulted in greater wildfire risk. Fire has historically been a natural wildland element and can sweep through vegetation that is adjacent to a combustible home. New residents in remote locations are often surprised to learn that in moving away from urban areas, they have left behind readily available fire services providing structural protection. Rural locations may be more difficult to access and or simply take more time for fire protection services to get there. There is general observation, and BLM staff concur, that

[14] Al Crouch, BLM, personal communication, March 4, 2019.

these wildland and WUI fires are increasing in severity and size.[15] Looking at the future climate projections described in Appendix E, it is likely these situations are already and will continue to be exacerbated by changes in the climate. In the Severe Summer Storms and Severe Winter Storms Hazard Annex, see Tables SS-1 and SS-2 which shows the Hermiston average annual precipitation and Tables SS-3 and SS-4 which shows the same information for Ukiah. It is clear that mean annual precipitation is low and this contributes to wildfire impacts and other natural hazards impacts.

History of Wildfire in Umatilla County

As described in more detail in Appendix B Community Profile, there are eight level four ecoregions within the Columbia Basin and Blue Mountains that can be found in Umatilla County; the Pleistocene Lake Basin, the Umatilla Plateau, the Yakima Folds, the Deep Loess Foothills, the Umatilla Dissected Uplands, the Maritime-Influenced Zone, the Mesic Forest Zone, and the Cold Basins.[16] These ecoregions have different topography and vegetation.

Areas in Oregon that contain large tracts of ponderosa pine and mixed conifer forests are highly vulnerable to wildfire because of natural aridity and the frequency of lightning strikes. Grasslands and brush lands, which naturally cover part of the region, also are problematic. The ecosystems of most forest and wildlands depend upon fire to maintain functions.

The effects of fire on ecosystem resources can include damages, benefits, or some combination of both. The benefits can include, depending upon location and other circumstances, reduced fuel load, disposal of slash and thinned tree stands, increased forage plant production, and improved wildlife habitats, hydrological processes, and aesthetic environments. Despite the benefits, fire has historically been suppressed for years because of its effects on forestlands, rangelands, grasslands, recreation areas, agricultural operations, and the significant threat to property and human life. Recognizing the economic, human, and environmental impacts, federal agencies have typically sought to alleviate fire-related problems through a controlled burning program.

Knowing the fire history of a place is important to understand the fire environment of the area. Knowing where and why fires start is one of the first steps in prevention and mitigation efforts. Understanding the burn probability, the hazard to potential structures, the fire intensity and flame length, and the sub-watershed level for context, provides comprehensive information for decision-making about wildfire prevention and mitigation.

Table WF-3 lists fires in Umatilla County and several fires outside of Umatilla County. Figure WF-14 Wildfire History shows the fire locations from 1992-2019 for fire locations of fires managed by ODF. It also shows the fire locations of fires managed by local fire districts from 2003 to August 2020. Tables WF-4 and WF-4 are from the *2014 Umatilla County NHMP* and they include information about fires 1970-2013 in the Umatilla National Forest (WF-4) and fires 1990-2013 from ODF (WF-5); these tables show the cause of the fire, the number of fires of that type, and the number of acres the type of fire burned.

A list of fires in Umatilla County is included in Table WF-3 below.

[15] Al Crouch, BLM, personal communication, March 4, 2019.

[16] Environmental Protection Agency, *Ecoregions of Oregon*, ftp://ftp.epa.gov/wed/ecoregions/or/or_front.pdf.

Table WF-3 Significant Historic Wildfires in Umatilla County

Date	Location	Description
2000	Umatilla County	Milepost 245 fire burned 121 acres.
2000	Umatilla County	Milepost 244 fire burned 4,096 acres.
2001	Umatilla County	Duncan fire burned 90 acres.
2001	Umatilla County	Mallory fire burned 7,926 acres.
2002	Umatilla County	Deerhorn fire burned 118 acres
2002	Umatilla County	Clark Springs fire burned 162 acres.
2002	Umatilla County	Chilson Creek fire burned 465 acres.
2003	Umatilla County	Juniper Canyon fire burned 3,103 acres.
2005	Umatilla County	Burnt Cabin fire burned 1,883 acres.
2007	Umatilla County	256 fire burned 4 acres.
2007	Umatilla County	Camas South fire burned 15 acres.
2007	Umatilla County	244 fire burned 48 acres.
2007	Umatilla County	245 fire burned 139 acres.
2007	Umatilla County	Bear fire burned 168 acres.
2007	Umatilla County	Camas aka 238 fire burned 179 acres.
2007	Umatilla County	Hidaway fire burned 226 acres.
2007	Umatilla County	Sugar Bowl aka 232 fire burned 390 acres.
2007	Umatilla County	Juniper Canyon fire burned 3,650 acres.
2007	Umatilla County	Owen Butte fire burned 3,770 acres.
2007	Umatilla County	On August 15, 2007, a complex of 29 fires near Ukiah burned several thousand acres of the Umatilla National Forest. No known structural damage occurred.
2009	Umatilla County	Randall Canyon burned 403 acres.
2011	Umatilla County	Vanscycle Canyon fire burned 4,510 acres.
2014	Umatilla County	McCommach fire burned 1,314 acres.
2013	Umatilla County	On June 11, 2013 several homes burned due to a wildfire.
2015	Umatilla County	State Line Command fire burned 8,008 acres.
2015	Umatilla County	On July 14, 2015 there was a fire that burned several thousand acres in the Southern Blue Mountains. It was a lightning induced wildfire.
2016	Umatilla County	Gibbon fire burned 303 acres.
2016	Umatilla County	Juniper Bluffs fire burned 636 acres.
2016	Umatilla County	McNary fire burned 938 acres.
2016	Umatilla County	On July 30, 2016 there was a wildfire near Meacham, OR; this is the Weigh Station fire. It burned 914 acres and shut down I-84 for a couple of days.
2018	Umatilla County	Lake Wallula fire burned 12,377 acres.
2020	Umatilla County	Meacham Complex fire occurred near Meacham, OR and burned 268 acres. It was spread out over a big area and was complicated to fight.
2020	Umatilla County	The East Fork Buttercreek fire occurred in the southern part of Umatilla County. It burned 12,700 acres.
2020	Umatilla County	On September 7, 2020 a fast-moving fire burned approximately 200 acres near the City of Umatilla, closing Interstate 82 and causing multiple evacuations of residential areas.

Sources: 2014 Umatilla County NHMP; 2020 Oregon NHMP; FEMA, Disaster Declarations for Oregon; Marcus Austin, NWS, personal communication, 4/27/20; Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21; Matt Hoehna, ODF, personal communication, 3/19/21, Bob Waldher, Umatilla County, personal communication, 3/30/21.

The *2014 Umatilla County NHMP* has these two tables which are retained for the *2021 Umatilla County NHMP*. Additional information about the history of fires in Umatilla County can be found in the three Umatilla County CWPPs.

Table WF-4 Wildfires 1970-2013 Umatilla National Forest Umatilla County

Cause of Fire	Total Number of Fires	Total Number of Acres
Lightning	819	73,542.5
Equipment Use	21	447
Smoking	24	13
Campfire	218	770
Debris Burning	16	422
Railroad	8	5,714
Arson	8	26
Children	3	1
Miscellaneous	58	2,266
TOTAL FIRES	1,159	82,779

Source: 2014 Umatilla County NHMP (Umatilla National Forest Database, Pendleton Office 2013)

Table WF-5 Wildfires 1990-2013 Oregon Department of Forestry Umatilla County

Cause of Fire	Total Number of Fires	Total Number of Acres
Lightning	348	83,207
Railroad	28	6,498
Equipment Use	90	4,786
Recreation	63	1,592
Smoking	13	42
Debris Burning	78	1,159
Arson	12	287

Source: 2014 Umatilla County NHMP (Oregon Department of Forestry Database, Pendleton Office 2013)

In looking through the history of wildfires in Oregon, there are numerous examples of large and impactful fires. The Long Draw Fire, the Miller Homestead Fire, and the Holloway Fire occurred in 2012 and did not occur in Umatilla County. They are described here in recognition of how fires can impact an area within the county of origin and outside of it. Two large fires, Barry Point and Lava, occurred in 2012 in Lake County; both were lightning ignited. They burned more than 114,000 acres combined. They are also described here. The 2002 fire season in Oregon included three significant fires which in total burned 110,000 acres. These fires - the Winter Rim, Silver and Toolbox were located in the Silver Lake Ranger District in Lake County. In 2007, the Egley Fire Complex (FM-2712) burned 140,360 acres from July 8 through July 25. It was started by lightning; threatened Hines and Burns. The 2020 wildfire season in Oregon was the worst ever, see below.

Long Draw Fire (July 2012): This lightning caused wildfire ignited on July 14, 2012 and burned 582,313 acres primarily within Malheur County, but also affecting Nevada and an area south of Burns Junction in Harney County.[17] It did not burn in Umatilla County but it is included here as an example. The fire spread to more than 200,000 acres in one day making it the third biggest fire in Oregon history at that time. Five crews, five helicopters, 29 engines, seven dozers, thirteen water tenders and 505 personnel were deployed to fight this fire. The fire destroyed range buildings,

17 Capital Press, *Bigger Wildfires Ahead, Researchers Warn*, https://www.capitalpress.com/state/oregon/bigger-wildfires-ahead-researchers-warn/article_8abe005a-cbf7-5528-b153-84b3dbae01a9.html, accessed 7/3/19.

scorched much-needed grass and destroyed cattle on the perimeter of the fire. It hopped U.S. 95, took out a power line and moved east into the Owyhee Canyon.[18]

Miller Homestead Fire (started July 2012): This lightning caused wildfire started on July 8th and burned approximately 160,850 acres near Frenchglen.[19] More than 450 personnel, including a dedicated structure protection division were deployed to this event. This was the largest Oregon wildfire since 2007, at that time, and the fire threatened the community of Frenchglen and the residents around Harney Lake. In response to this fire event, the Oregon Cattlemen's Association set up a relief fund to aid ranchers affected by the fire; ranchers lost cattle threatening their short and long term income potential[20].

Holloway Fire (August 2012): The Holloway Fire, this lightning caused fire ignited on August 5, 2012 and originated 25 miles east of Denio, Nevada and burned approximately 75,000 acres within Harney County (461,047 acres total). Thirteen crews, four helicopters, 69 engines, 27 dozers, 16 water tenders and 826 personnel were deployed to fight this fire.

Lava Fire (July 2012): This lightning caused wildfire ignited on July 23, 2012 north of Christmas Valley and 15 miles northeast of Fort Rock. The fire burned 21,546 acres primarily within Lake County.[21]

Barry Point Fire (August 2012): This lightning caused wildfire ignited on August 6, 2012 twenty-two miles southwest of Lakeview and burned 93,071 acres primarily within Lake County, though it stretched into California.[22] In Lake County, fire primary burned federal land (43,225 acres) though it also burned 11,452 acres of private land.[23] The fire required the mandatory evacuation of over 20 residences,[24] with nearly 1,300 people on the fire lines.[25] The image in Figure WF-3 shows firefighters from the Baker River Hot Shots conducting burnout operations around a structure on the edge of the Fremont-Winema National Forest.

2020 Oregon Wildfire Season: During 2020, wildfires burned over 1.2 million acres in Oregon and destroyed 4,000 homes. Nine civilians and two firefighters lost their lives. 2020 was the most

18 InciWeb: Incident Information System, *Long Draw Fire Information*, http://inciweb.nwcg.gov/photos/ORVAD/2012-07-11-08:03-long-draw/related_files/ftp-20120716-100631.pdf, accessed March 26, 2013. Link broken.

19 Oregon Live, *Miller Homestead fire: Evacuation risk lowered in Frenchglen, Harney Lake*, https://www.oregonlive.com/pacific-northwest-news/2012/07/miller_homestead_fire_evacuati.html,

accessed February 2013.

20 InciWeb: *Incident Information System, Cattlemen Launch Fire Relief Effort,* http://www.inciweb.org/incident/article/3003/15198/, accessed March 26, 2013, link broken.

21 Inciweb: Incident Information System http://www.inciweb.org/incident/3064/

22 Capital Press "Bigger wildfires ahead, researchers warn http://www.capitalpress.com/newsletter/ml-wildfire-restoration-073112-art-w-graph-w-side Accessed February 2013

23 Inciweb: Incident Information System http://www.inciweb.org/incident/3105/

24 Oregon Live "Wildfire roundup…" August 2012 http://www.oregonlive.com/pacific-northwest-news/index.ssf/2012/08/wildfire_roundup_lightning_sat.html

25 Oregon Live "Lightning ignites two new fire in Oregon, Washington" August 2012 http://www.oregonlive.com/pacific-northwest-news/index.ssf/2012/08/lightning_ignites_two_new_fire.html

destructive wildfire season in Oregon in history. Figure WF-2 provides a visual of wildfire history from ODF with several statistics for 2020 highlighted.

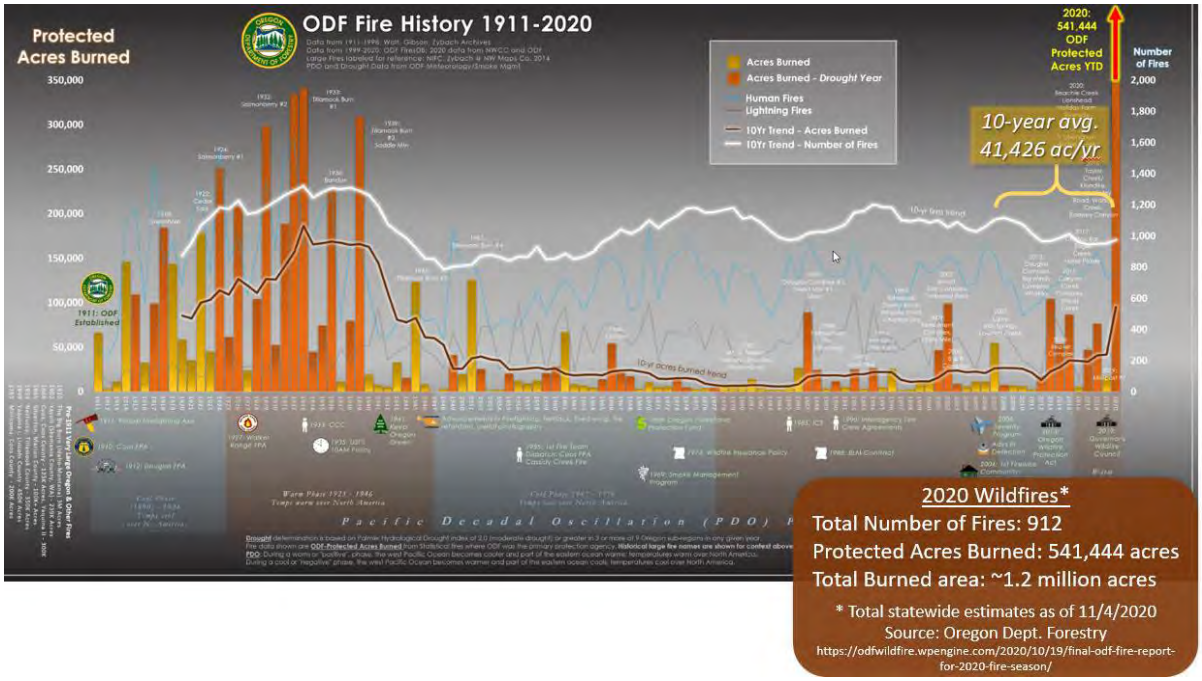
According to ODF's *2020 Fire Season* document[26], much of the state was in severe drought from spring onward. Numerous wildfires broke out in a very dry southern Oregon in April, leading Southwest Oregon to declare the start of fire season on May 1, which is a month earlier than usual. During the summer, human-caused wildfires were up slightly but fewer lightning-caused fires occurred until mid-August. In August, there were five days of lightning across the state. Fires started by those lightning strikes were fanned by winds and high temperatures into large blazes.

On August 19, 2020 Governor Brown declared a statewide State of Emergency. This made available the Oregon National Guard for firefighting, including personnel and equipment. On September 7, 2020, against a backdrop of drought and historically low fuel moistures and humidity, a high wind warning was issued. A strong cold front arrived in the early evening, with east-northeast winds at sustained speeds of 20 to 30 miles per hour (mph) and gusts to 50 to 60 mph. This was the strongest three-day easterly wind event during fire season since at least 1950 (winds were stronger in the 1962 Columbus Day storm, but that hit after fire season).

There were 14 fires from the Labor Day wind event that would be approved as a FEMA FMAG fire. Five fires in the Cascade Mountains soon spread west to become megafires (over 100,000 acres), almost as many as occurred in Oregon in the entire 20th century. All five of these fires moved into Oregon's top 20 wildfires by size since 1900. Firefighting personnel and equipment poured into Oregon from more than 30 different U.S. states and Canada, peaking at about 7,500. The Labor Day wildfires were mostly contained by late September or October 2020.

[26] Teresa Zena Alcock (TZA), ODF, personal communication, 3/30/21. TZA provided the *2020 Fire Season* document which is in draft form and not yet published.

Figure WF-2 ODF Fire History 1911-2020



Source: Celinda Adair, DLCD, Oregon State NFIP Coordinator, March 4, 2021 presentation "2020 Oregon Wildfires: Post-Wildfire Floodplain Management," part of the National Flood Services Expert Series Webinars

Figure WF-3 Firefighters Performing Structure Protection Burnout Operation

Source: Kevin Abel, BLM Lakeview District

Risk Assessment

Wildfire risk combines the likelihood of a fire occurring with the exposure and susceptibility of valued resources and assets on the landscape.[27] Umatilla County has three developed Community Wildfire Protection Plans (CWPPs) with the intention of addressing wildfires within the WUI boundaries and affecting the communities throughout the County. One purpose of the CWPP is for

[27] Source: Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21

communities to take advantage of opportunities offered under the Healthy Forests Restoration Act of 2003 (HFRA) legislation.

The *Umatilla County CWPPs* encourage citizens to take an active role in identifying needs, developing strategies, and implementing solutions to address wildfire risk by assisting with the development of local community wildfire plans and participating in countywide fire prevention activities.

Human life and welfare are values at risk to wildfire because of the buildup of hazardous fuels around communities and structures, poor emergency vehicle ingress and egress, a large area to cover with the fire authorities, and inadequately trained and/or equipped fire suppression authorities. Throughout Umatilla County, there are scattered small communities and ranches with houses and out-buildings without structural fire protection because they are outside the fire protection districts and municipal fire departments. Economic values at risk include businesses, farmland, ranchland, grazing land, hunting and other recreational land, historic and cultural sites, and critical infrastructure.

Umatilla County has mitigation actions for wildfire in the three *Umatilla County CWPPs*. The CWPPs list mitigation actions that communities and the County can implement to reduce the risk of fires on communities. This NHMP will be an additional tool to mitigate wildfires as it too has mitigation actions; it strives to incorporate CWPP and NHMP information to ensure consistency between plans. The *2021 Umatilla County NHMP* has wildfire-specific mitigation actions that the Umatilla County Steering Committee has adopted. See Table 3-1, 2021 Umatilla County NHMP Mitigation Actions. The three CWPPs are included in this NHMP in Appendix I.

The Healthy Forests Restoration Act of 2003 (HFRA) provides the impetus for wildfire risk assessment and planning at the county and community level. The HFRA refers to this level of planning as Community Wildfire Protection Plans (CWPP). The minimum requirements for a CWPP as described in the HFRA are:

- Collaboration: A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties. Prioritized Fuel Reduction: A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.
- Treatment of Structural Ignitability: A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.[28]

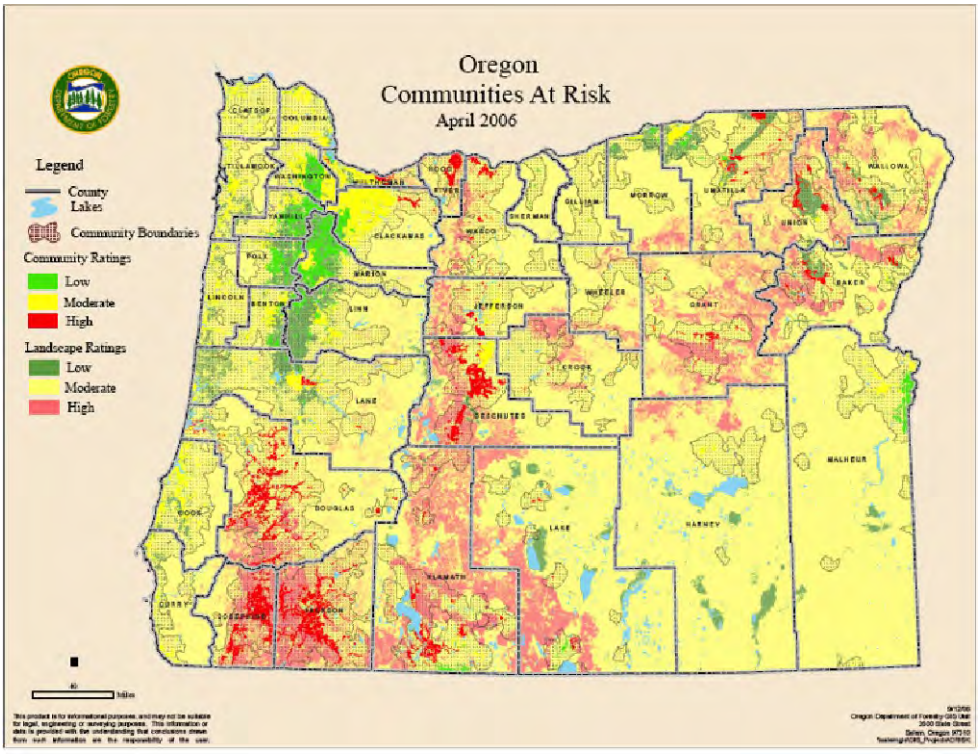
A community at risk is a geographic area within and surrounding permanent dwellings (at least one home per 40 acres) with basic infrastructure and services, under a common fire protection jurisdiction, government, or tribal trust or allotment, for which there is a significant threat due to wildfire. A statewide *Communities at Risk* map was created in 2006 to identify and assess communities at risk of wildfire in the state of Oregon; the map is used to establish wildland urban interface (WUI) boundaries in the absence of a CWPP.

According to *Oregon's Communities at Risk Assessment, "*A Community at Risk includes the geographic area within and surrounding the populated areas - adjacent landscapes that contain vegetation creating a risk to the community, generally a sixth field watershed, and municipal

[28] *2011 Lake County CWPP*, https://www.oregon.gov/ODF/Documents/Fire/CWPP/LakeCountyCWPP.pdf

watersheds. It is based upon a "fire shed" concept, including the area surrounding the community where economic, social, cultural, and visual values important to the community exist, and where strategic fuel reduction planning needs to occur to protect the community from large catastrophic wildfires. The statewide process identified areas within two km of populated jurisdictions, as well as the adjacent sixth field watershed(s), not exceeding 8 km. NOTE: This is a significant change from the 2001 Community at Risk (CAR) map for Oregon, which primarily identified populated areas."[29]

Figure WF-4 Communities at Risk



Source: Oregon Department of Forestry, *Oregon's Communities at Risk Assessment*, September 12, 2006, http://library.state.or.us/repository/2007/200710150832491/index.pdf.

Hazard Risk Analysis

The Umatilla County NHMP Steering Committee completed a Hazard Vulnerability Assessment/Analysis (HVA) during this NHMP update. This was described in Section 2 Risk Assessment. The method used for the HVA was developed from a Federal Emergency Management Agency (FEMA) tool that has been refined by the Oregon Office of Emergency Management (OEM). It addresses and weights (shown as percent within parentheses) probability (29%), vulnerability (21%), maximum threat (42%) and the history (8%) of each natural hazard and attributes a final hazard analysis score. The methodology produces scores that range from 24 to 240.

For local governments, conducting the HVA is a useful step in planning for hazard mitigation. The method provides the jurisdiction with a relative ranking from which to prioritize mitigation actions, but does not predict the occurrence of a particular hazard.

[29] ODF, *Oregon's Communities at Risk Assessment*, September 12, 2006, http://library.state.or.us/repository/2007/200710150832491/index.pdf.

Wildfire was ranked second in the *2014 Umatilla County NHMP*. In the *2021 Umatilla County NHMP* it is ranked fifth out of nine hazards (removed weather emergencies and added air quality).

For more information on all the risk scores and ranks of the natural hazards, see Volume I Basic Plan, Section 2 Risk Assessment of this NHMP.

Probability Assessment

In Oregon, wildfires are inevitable. Although usually thought of as being a summer occurrence, wildfires can occur during any month of the year. The vast majority of wildfires burn during June to October time period. Dry spells during the winter months, especially when combined with winds and dead fuels, may result in fires that burn with intensity and a rate of spread that surprises many people. Wildfire risk to human welfare and economic and ecological values is more serious today than in the past because of the buildup of hazardous fuels, construction of houses in proximity to forests and rangelands, increased outdoor recreation, and a lack of public appreciation of wildfire.[30]

The natural ignition of forest fires is largely a function of weather and fuel; human-caused fires add another dimension to the probability. Dry and diseased forests can be mapped accurately and some statement can be made about the probability of lightning strikes. Each forest is different and consequently has different probability and recurrence estimates.

Figure WF-14 Wildfire History shows the fire locations from 1992-2019 for fire locations of fires managed by ODF. It also shows the fire locations of fires managed by local fire districts from 2003 to August 2020. Tables WF-4 and WF-5 are from the *2014 Umatilla County NHMP* and they include information about fires 1970-2013 in the Umatilla National Forest (WF-4) and fires 1990-2013 from ODF (WF-5); these tables show the cause of the fire, the number of fires of that type, and the number of acres the type of fire burned.

Figure WF-15 Wildfire Hazard: Burn Probability shows Umatilla County's burn probability areas; there are no low probability areas. Burn probability shows the annual likelihood of occurrence of a large wildfire great than 250 acres, considering weather, topography, fire history and fuels (vegetation), including recently disturbed fuels from large Oregon wildfires in notable years 2013, 2014, 2015, and 2017.[31]

Figure WF-18 Umatilla County Wildfire Hazard: Overall Wildfire Risk shows risk levels as low, moderate, high, and very high. According to the metadata description, the following factors are considered: the likelihood of a fire burning; the intensity of a fire if one should occur; the exposure of assets and resources based on their locations; and the susceptibility of those assets and resources to wildfire.

Additional maps included as figures in this Wildfire Annex are described in the Vulnerability section. Full descriptions of all the wildfire maps and links to the datasets for these maps can be found in Appendix F Umatilla County NHMP Hazards Maps Details.[32]

[30] Ibid.

[31] Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21

[32] Wildfire Risk Maps dataset, https://www.oregon.gov/odf/aboutodf/pages/mapsdata.aspx

Wildfire has always been a part of these ecosystems. The intensity and behavior of wildfire depends on a number of factors including fuel, topography, weather, and density of development. Strategies to reduce the negative impacts of wildfire include: land-use regulations, management techniques, site standards, building codes, and state level legislation (e.g. the Oregon Forestland-Urban Interface Fire Protection Act of 1997, HFRA in 2003, etc.). All of these strategies have a bearing on a community's ability to prevent, withstand, and recover from a wildfire event.

Vulnerability Assessment

As was discussed earlier, each year a significant number of people build homes within or on the edge of the forest (WUI), thereby increasing wildfire hazards. Many Oregon communities (incorporated and unincorporated) are within or abut areas subject to serious wildfire hazards, complicating firefighting efforts and significantly increasing the cost of fire suppression.

Each forest is different and consequently has different probability/recurrence estimates. As population growth continues to expand and development increases in the WUI, the threat to life and property increases and ultimately, greater losses to are likely to result. The level of risk from wildfire can be determined through the comparison of the overlap of hazard and exposure.

The *2005 Blue Mountain and Foothills CWPP* measures fire regime condition class (FRCC) as one method to determine vulnerability to the wildfire hazard in the community. As described, the FRCC measures the degree of departure from a historic reference condition which may occur due to changes in ecosystem components (vegetation characteristics), fuels composition, fire frequency, severity, and pattern and other changes such as insect and disease mortality, grazing and drought[33]. The FRCC condition classes 1, 2 and 3 represent low-, moderate-, and high- hazardous fuel situations and potential risks respectively[34]. The *2005 Blue Mountain and Foothills CWPP* describes that most of Umatilla County is in condition class 2 and 3.

For more information on fire regimes, risks, and other details, read the three *Umatilla County CWPPs*. Using the *Umatilla County CWPPs* in addition to other information provides a blend of wildfire information in this NHMP from the past, present, and future.

These figures show vulnerability: Figure WF-16 Umatilla County Wildfire Hazard: Wildfire Risk to Property and People, Figure WF-17 Umatilla County Wildfire Hazard: Risk to Assets, Figure WF-18 Umatilla County Wildfire Hazard: Overall Wildfire Risk, Figure WF-19 Umatilla County Wildfire Hazard: Wildfire Smoke Sensitivity, and Figure WF-20 Umatilla County Wildfire Hazard: Wildfire Weather Zones.

Community Hazard Issues

What is susceptible to damage during a hazard event?

Air Quality

Air Quality is a concern for residents of Pendleton and other areas of Umatilla County due to cold air inversions (capping inversions) and wildfires that occur primarily during summer months. In the past, the sources of air pollution in the region included field burning, vehicle emissions, industry and

[33] Ibid.

[34] Ibid.

residential wood stoves, which emit particulate matter and carbon monoxide. Substantial efforts have been made to reduce these emissions. More recently, concerns for air quality arise when smoke from regional wildfires either blows through or becomes trapped during inversions. Wood stove, industrial, and motor vehicle emissions also continue to be a source of air (and other types of) pollution. See the Air Quality Annex for more information about wildfire impacts.

Threat to Life and Property

As has been described, there is a lot of exposure to life and property from wildfire. In many cases, existing fire protection services cannot adequately protect new development. Wildfires that also involve structures present complex and dangerous situations. Knowing the landownership and management is important for hazard planning and for awareness when wildfires occur.

The total land base in Oregon is approximately 63 million acres, or just over 98,000 square miles. Umatilla County contains 2,068,353 Acres: (3,232 Sq. Miles). Within the entire state, the US Forest Service (USFS) manages just over 17 million acres, and US Bureau of Land Management (BLM) manages nearly 16 million acres; together they manage about 52% of the total land base. Other landownership and management types include other federal lands (e.g. US Fish and Wildlife Service [USFWS]), state, tribal, and private. Of the nearly 30 million acres of forestland in Oregon, approximately 18 million is federal, 10 million is private, 1 million is state, and 475,000 acres are tribal. Many forested areas in Oregon are private, owned and managed for industrial timber and in small family farms and woodlands.[35]

In Umatilla County, 69% of the land is privately owned. The federal government owns 23% of the land within Umatilla County, while the state of Oregon owns 1%. The largest agency with authority over federal land is the U.S. Forest Service (USFS) with 20%. Tribal ownership is 8%. See Table WF-5 and Figure WF-6 for graphics about land ownership within Umatilla County.[36]

The *2014 Umatilla County NHMP* described,

> "Umatilla County's urban areas have the potential for structural fire hazards typical of jurisdictions with a mix of residential, business and industrial areas. No high-rise buildings are located in the county, except for the new high rise hotel (10 stories) located next to the Wildhorse Resort and Casino on the Umatilla Indian Reservation. However, large numbers of people could be threatened at public-gathering places, for example during County fair or the Pendleton Round up. Approximately 12% of the County consists of forest land used by the timber industry and for recreation. This land constitutes a significant threat for forest fires. In addition, the County faces the threat of wild lands/urban interface fires from large areas of rangeland and dry land crops coming in contact with continuing residential construction in the interface zones in the County."

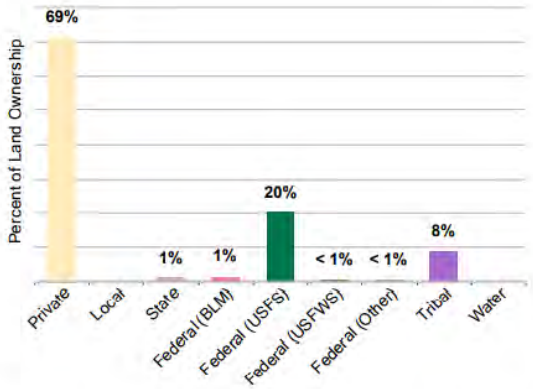
[35] Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21

[36] Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21

Figure WF-5 Land Ownership and Management in Umatilla County, OR

Umatilla County

	Major Landowner/Manager	Acres
	Private	1,426,689
	Local	0
	State	19,848
	Bureau of Land Management (BLM)	23,192
	US Forest Service (USFS)	402,667
	US Fish & Wildlife (USFWS)	6,488
	Other Federal	9,534
	Tribal	174,852
	Water	0

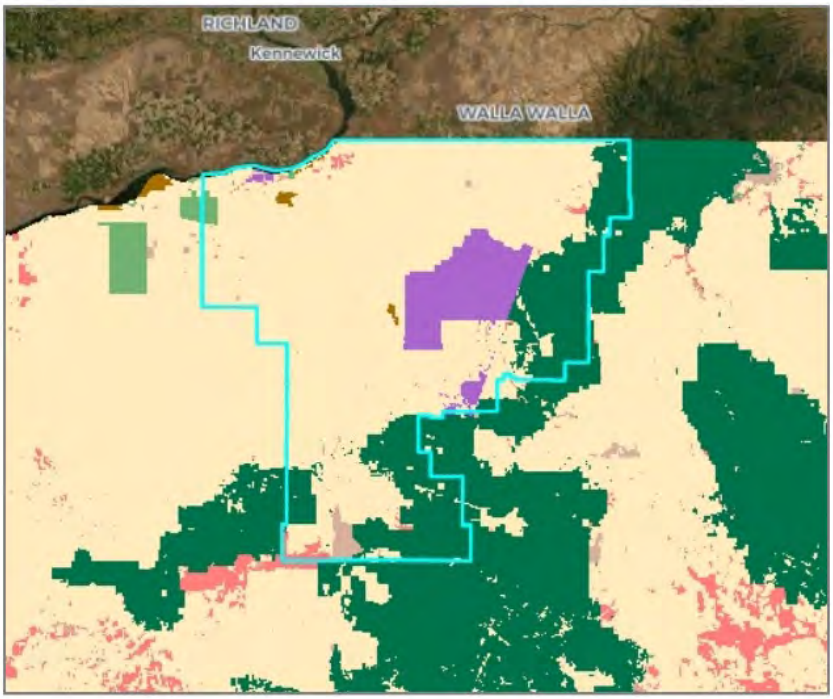


Source: Bureau of Land Management, 2015

** Values may add up to over 100% due to rounding precision*

Source: Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21

Figure WF-6 Landownership in Umatilla County, OR



Source: Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21

Personal Choices and Private Lands

Many interface areas, found at lower elevations and drier sites, are also desirable real estate. More people in Oregon are becoming vulnerable to wildfire by choosing to live in wildfire-prone areas.[37]

Private development in Umatilla County located outside of rural fire districts where structural fire protection is not provided is at risk. In certain areas fire trucks cannot negotiate steep grades, poor road surfaces, narrow roads, flammable or inadequately designed bridges, or traffic attempting to evacuate the area. Little water during the fire season, and severe fuel loading problems add to the problem. In some areas, current protection resources are stretched thin, thus both property in the interface and traditionally protected property in the forests and cities are at greater risk from fire.

While the Firewise program has increased knowledge of fire risk, many property owners in the interface are not aware of the problems and threats that they face, and owners in some areas have done little to manage or offset fire hazards or risks on their own property.

It is useful to see how much land is developed with residences in Umatilla County and to see what percentage of WUI is developed. Note that the source of this information describes that this information is only available for 11 western states and does not include Alaska and Hawaii.[38]

In Figure WF-7, the land area developed with residences in Umatilla County is shown in comparison to the United States as a whole.

In Figure WF-8, the percentage of WUI that is developed is shown for Umatilla County in comparison to the United States.

The importance of development in wildfire prone areas is aptly described here,

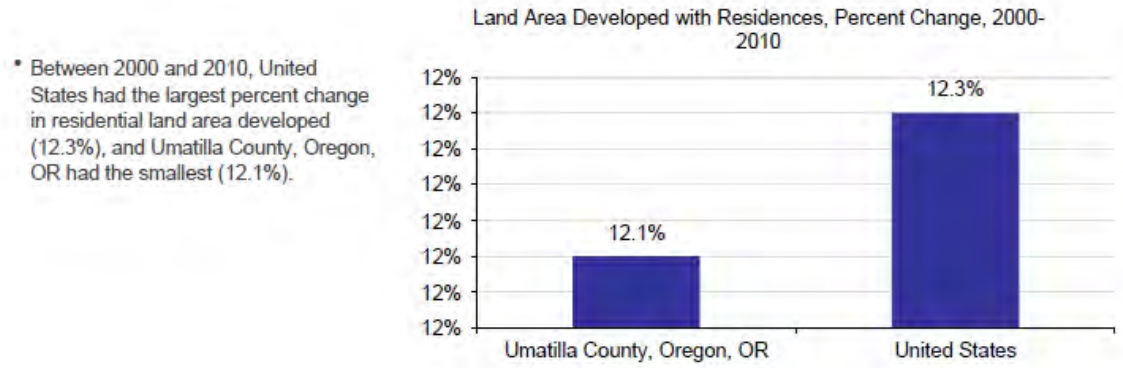
> ”The conversion of open space and agricultural land to residential development has occurred at a rapid pace in many parts of the U.S. The popularity of exurban lot sizes in much of the country has exacerbated this trend. (Low-density development results in a larger area of land converted to residential development). The pattern of development can reflect a number of factors, including demographic trends, the increasingly "footloose" nature of economic activity, the availability and price of land, and preferences for homes on larger lots. Locations with a large percent change in the area of residential development often have experienced significant in-migration from more urbanized areas. Counties with a small percent change either experienced little growth or were already highly urbanized in 2000.
>
> Development of homes adjacent to fire-prone federal public lands poses several challenges including the rising cost of protecting homes from wildfires; increased danger to wildland firefighters; and the consumption of funds that might otherwise be used for restoration, recreation, research, and other activities. When protecting homes is a priority, agencies are

[37] National Wildland/Urban Interface Fire Protection Program, *Fire protection in the Wildland/Urban Interface: Everyone's responsibility*, http://www.geosci.sfsu.edu/Geosciences/classes/e360/OaklandHillsFire/www.firewise.org/pubs/everyones_resp/pdf/resp.pdf

[38] BLM Summary Profile, *Umatilla County, OR*, 5/26/20

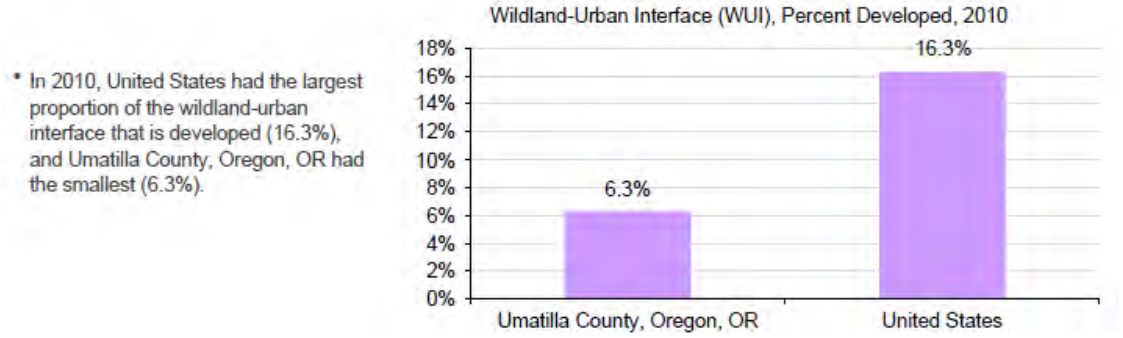
unable to allow otherwise beneficial fires to burn, even those that could reduce fuel loads."[39]

Figure WF-7 Development and the WUI: Land Developed with Residences



Source: BLM Summary Profile, *Umatilla County, OR*, 5/26/20

Figure WF-8 Development and the WUI: WUI Percent Developed



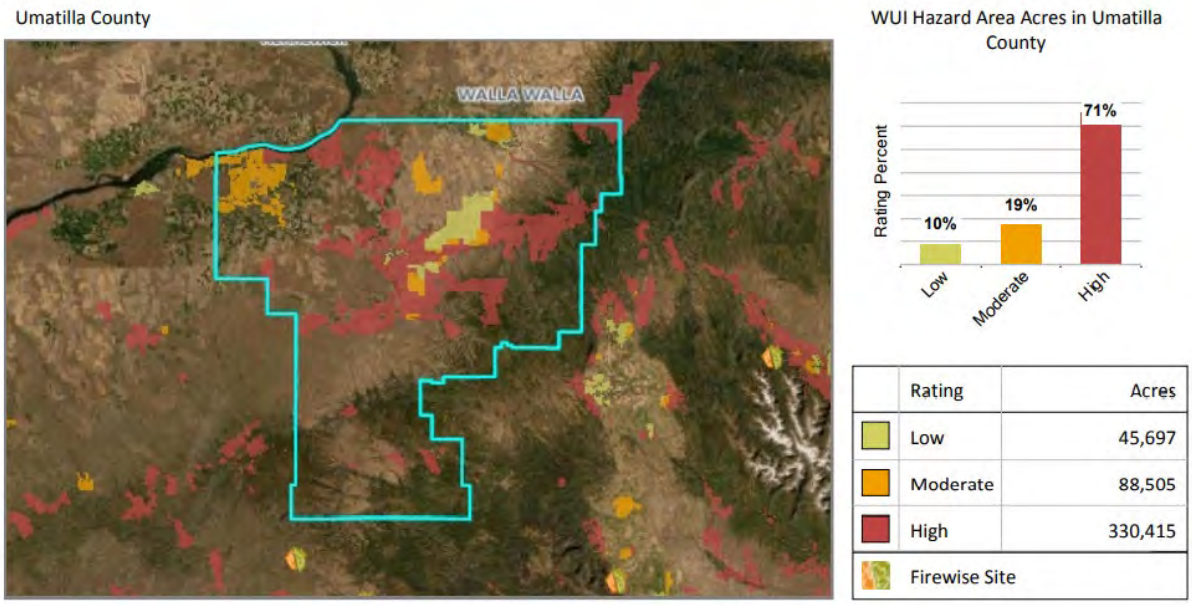
Source: BLM Summary Profile, *Umatilla County, OR*, 5/26/20

Of the nearly 1.7 million homes in Oregon, over 603,000, or 36%, are in the WUI.[40] In looking at the WUI developed areas in Umatilla County, further analysis can be made to see where the areas are that are low, moderate, and high hazard in the WUI and what amount of land there is of each.

[39] BLM Summary Profile, *Umatilla County, OR*, 5/26/20

[40] Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21

Figure WF-9 Development and the WUI: Amount of WUI in Low, Moderate, and High Hazard



Source: Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21

Drought

Recent concerns about the effects of climate change, particularly drought, are contributing to concerns about wildfire vulnerability. Unusually dry winters and hot summers increase the likelihood of a wildfire event, and place importance on mitigating the impacts of wildfire before an event takes place. See the Drought Annex in this NHMP for more information about droughts.

Table WF-10 Housing Density in Umatilla County Per Acre

Umatilla County housing density

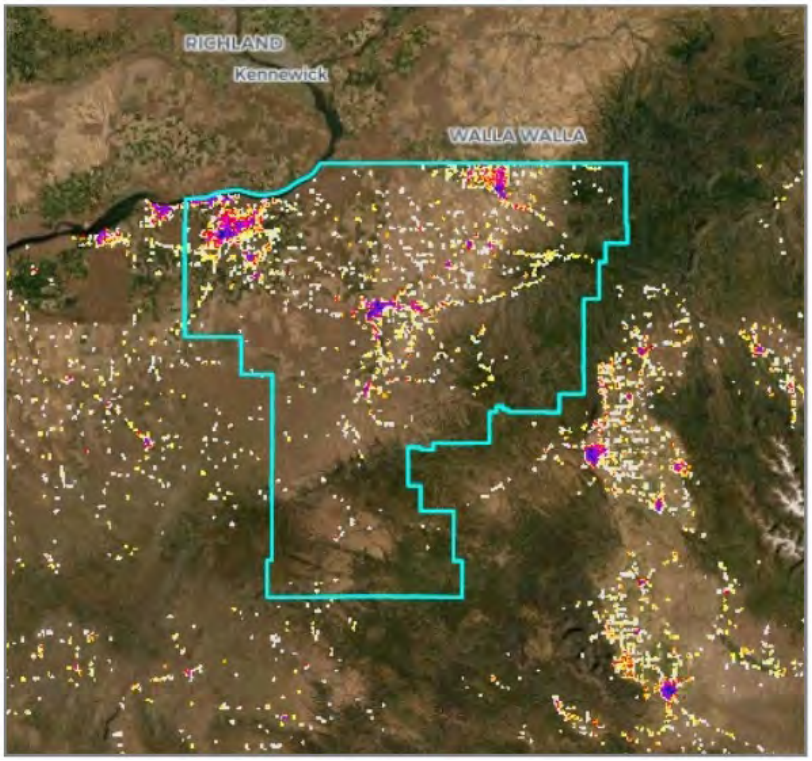
Category	Acres	%*
<1 house per 40 acres	41,381	2
1 per 40 acres to 1 per 20 acres	23,996	1
1 per 20 acres to 1 per 10 acres	16,460	< 1
1 per 10 acres to 1 per 5 acres	12,771	< 1
1 per 5 acres to 1 per 2 acres	11,693	< 1
1 per 2 acres to 3 per acres	11,430	< 1
> 3 per acres	1,549	< 1

Source: 2013 West Wide Wildfire Risk Assessment, ODF

** Values may add up to over 100% due to rounding precision*

Source: Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21

Figure WF-11 Housing Density in Umatilla County



Source: Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21

Existing Hazard Mitigation Activities and Resources

Ordinances

People proposing to construct new buildings in Umatilla County and the Cities are given instructions from the appropriate fire district to ensure fire access for their structure. The instructions are not a binding ordinance, but are based on recommended state standards. Contact the respective jurisdiction with authority.

Zoning ordinances vary for each community. Checking the websites of each of the jurisdictions participating in this *2021 Umatilla County NHMP* provides the following:

- Umatilla County, http://www.co.umatilla.or.us/planning/
- Adams, http://www.cityofadamsoregon.com/
- Athena, https://www.cityofathena.com/
- Echo, https://echo-oregon.com/
- Helix, this link is on the Umatilla County website, http://www.co.umatilla.or.us/planning/city_info.html#Helix
- Hermiston, https://www.hermiston.or.us/commdev
- Milton-Freewater, https://www.mfcity.com/
- Pilot Rock, https://www.cityofpilotrock.org/
- Pendleton, https://pendleton.or.us/

- Stanfield, https://cityofstanfield.com/
- Ukiah, http://www.cityofukiahoregon.com/
- Umatilla, https://www.umatilla-city.org/
- Weston, http://www.cityofwestonoregon.com/

As described in the *2014 Umatilla County NHMP*,

> "Oregon Administrative Rule requires fire sighting safety standards for all dwellings placed in the Grazing Farm (Forest Zone) of Umatilla County. These fire sighting standards are codified in the Umatilla County Development Code under Section 152.089. In addition to fire standards required by OAR, Umatilla County requires that all new development meet specific access standards and conform to recommendations of a rural fire protection district if the development is within the boundaries of that district."[41]

Of note, Chapters 91 and 95 of the Umatilla County Code of Ordinances include provisions for regulating all agricultural and non-agricultural burning outside of fire districts. Chapter 91 is Fire Prevention and Protection and Chapter 95 is Smoke Management. These ordinances generally relate to air quality concerns but provide legal authority for the Board of Commissioners to ban burning during times of the year when dangerous fire weather conditions exist. The Umatilla County Code of Ordinances is available online, http://www.co.umatilla.or.us/bcc/code-ordinances.html.

Unwanted plants, commonly referred to as weeds, can be a source of fire. Umatilla County has a Weed Ordinance and a Weed Control program; see Chapter 97 of the Umatilla County Code of Ordinances. As described in the 2014 Umatilla County NHMP,

> "The control of noxious weeds is a total community effort, requiring all landowners/operators to control the growth and spread of noxious weeds on their land and to prevent the infestation of adjacent lands. The Umatilla County Weed Control Board is dedicated to promoting Integrated Vegetation Management (IVM), specifically regarding noxious weed control. Voluntary compliance with the State Noxious Weed Control Law and Umatilla County Weed Control Ordinance is the preferred outcome. In the interest of keeping up to date with changes and progresses in laws, products, management strategies, and the like, the Supervisor, and staff maintain membership in industry related organizations. Weed Control staff or a representative can visit property if request to help identify weeds or to see if weeds need to be managed. They can make recommendations based on the use of land, native vegetation, soil types, elevation, and proximity to water sources, and more. This inspection is provided free of charge on an as time permits basis. Umatilla County Weed Control."

State Natural Hazard Risk Assessment

The risk assessment in the *2020 Oregon Natural Hazards Mitigation Plan* provides an overview of wildfires risk in Oregon and identifies the most significant wildfires in Oregon's recorded history. It has overall state and regional information, and includes wildfire mitigation actions for the entire https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

[41] *2014 Umatilla County NHMP*, May 2015

Planning for Natural Hazards: Oregon Technical Resource Guide

This guide describes basic mitigation strategies and resources related to wildfires and other natural hazards, including examples from communities in Oregon.
https://scholarsbank.uoregon.edu/xmlui/handle/1794/1909

Emergency Operations Plans

Umatilla County Emergency Management (UCEM) coordinates with NOAA NWS when notices may be required to inform response agencies and the general public of potential emergency events. UCEM response and coordination is outlined in the Umatilla County *Emergency Operations Plan* and usually involves disseminating materials addressing shelter locations, response contact information and other information. Should an emergency event become severe, UCEM is can activate the Emergency Operations Center (EOC) and Joint Information Center (JIC) to coordinate emergency response, evacuation and the dissemination of important public safety information.[42]

The *Umatilla County EOP*, dated January 2012 (ordinance 2012-01 passed 1/18/12), is an all-hazard plan that describes how Umatilla County will organize and respond to emergencies and disasters in the community. It is based on, and is consistent with Federal, State of Oregon, and other applicable laws, regulations, plans, and policies, including the National Response Framework, and State of Oregon Emergency Operations Plan. The *Umatilla County EOP* is one component of the County's emergency management program and is designed to be compliant with the National Incident Management System.

The *Umatilla County EOP* consists of a Basic Plan, Emergency Support Function Annexes that complement the Federal and State Emergency Support Functions, Support Annexes, and Incident Annexes. It provides a framework for coordinated response and recovery activities during an emergency. It describes how agencies and organizations in Umatilla County will coordinate resources and activities with other Federal, State, local, tribal, and private-sector partners.[43] The *Umatilla County EOP* includes fire/wildfire as a hazard.

Umatilla County Emergency Operations Plan, http://www.co.umatilla.or.us/bcc/codes/35.pdf

Existing Fire Authorities

Mutual Aid Agreements exist among the various fire authorities for support and help as needed. Each authority has its regulations and limitations, which dictates its fire management activity. Most all areas of Umatilla County have a base level of wildland fire protection, however only areas covered by Fire Protection Districts, Rural Fire Departments, the Cities, and CTUIR have structural protection.

Federal and State Agencies

The following are the existing fire suppression and management authorities within Umatilla County. The federal land management agencies (USFS, BLM, USFWS) all have wildland fire suppression

[42] *2014 Umatilla County NHMP*, May 2015

[43] Ecology and Environment, Inc., *Umatilla County Emergency Operations Plan*, January 2012.

responsibilities on their respective ownerships. The state, through ODF, provides wildland fire suppression on private and other public forestlands. The USFS, BLM, USFWS, and ODF are jointly dispatched out of the Blue Mountain Interagency Fire Center which is also referred to as the Blue Mountain Interagency Dispatch Center (BMIDC); it is located in La Grande. The La Grande Air Tanker Base and the La Grande Fire Cache are also located there. The BMIDC is the focal point for coordinating the mobilization of resources for wildland fire, wildland fire use, prescribed fire and other all-risk incidents throughout Northeast Oregon and Southeast Washington. The dispatch center also provides Intelligence and Predictive Services related-products to support wildland fire managers and firefighters throughout BMIDC's zone of influence.[44]

Umatilla County and the Cities have fire protection via fire protection districts, as municipal fire departments, and as rangeland fire protection associations.

Fire Protection Districts

In Umatilla County's Smoke Management Chapter, Chapter 95 of the Umatilla County Code of Ordinances, fire districts are identified as "Any fire protection district that is funded by taxes paid by those who reside within boundaries established and recorded by Umatilla County. http://www.co.umatilla.or.us/bcc/codes/95.pdf

The fire protection district map, WF-12, shows numerous fire districts for Umatilla County: State Fire Protection; Milton-Freewater Contract Fire Protection, Umatilla Fire District, Umatilla County Fire District #1; Echo Fire District; Riverside Fire District; Lower McKay Fire District; McKay Fire District; Pilot Rock Fire District; Helix Fire District; East Umatilla Fire and Rescue District; National Forest Service; and Tribal Fire Protection.

The fire protection districts data set was created and is maintained by Umatilla County. The map was created as a guide to members of the public and public officials to identify which district a property is protected under, if any. See Figure WF-12 Umatilla County Fire Protection Districts.

In the *2014 Umatilla County NHMP*, there was a description of rural fire protection districts as follows, "Eleven Rural Fire Protection Districts and one private fire department provide wildland urban interface fire protection to most inhabited areas in Umatilla County. Some areas not covered by rural fire districts may fall within the fire protection boundaries of the Oregon Department of Forestry or may not be protected. Other areas are not covered by a fire protection district." The RFD's have both wildland and structural fire authority in their respective districts. For much of the remaining, less populated rangelands, Rangeland Fire Protection Associations (RFPA) provide wildland fire suppression.

Rural Fire Districts (RFD)

Rural Fire Districts in Oregon are formed under the Oregon State Fire Marshall and provide both structural and wildland fire protection. Rural fire districts currently promote fire safe education and other related outreach, as well as encourage landowners to observe Oregon Department of Forestry fire prevention practices.

In Umatilla County, the RFD's are: Umatilla Rural Fire District, Umatilla County Fire District 1, and the East Umatilla Fire and Rescue District. There is also the McKay Fire District, Lower McKay Fire

[44] Blue Mountain Interagency Dispatch Center, *Welcome to the Blue Mountain Interagency Fire Center*, http://bmidc.org/index.shtml

District, Riverside Fire District, Echo Fire District, and the Pilot Rock Fire District. The Helix Fire District became part of the East Umatilla Fire and Rescue District.[45] Rural Fire Districts are deployed through the local 911 dispatch. Each agency has agreements with the State and Federal Wildland Agencies. RFD's are members of the Umatilla County Fire Defense Board[46]. Figure WF-12 is a map of the fire districts in Umatilla County.

Rangeland Fire Protection Associations (RFPA)

Rangeland Fire Protection Associations (RFPAs) provide wildfire protection of private rangeland within some counties in Oregon but not in Umatilla County.[47] RFPAs (formed under ORS 477.315) protect over 3.2 million acres of private land in eastern Oregon with support from ODF. RFPAs operate as independent associations of landowners that provide their own protection with the support of the ODF (chiefly technical support for grants, grant writing, procurement of equipment and fire-fighting training)[48].

A statewide agreement between the Bureau of Land Management and Oregon exists. The ODF provides a small source of funding for the RFPAs, however, the majority of funds come from federal grants (primarily Volunteer Fire Assistance and Rural Fire Assistance). Additional fees are collected from voluntary membership dues. As noted above, BLM also supports the RFPAs.

The RFPA has a responsibility to protect private lands of members and non-members alike pursuant the agreement formed with ODF when the RFPA is created. These all-volunteer crews of ranchers have training and legal authority to respond to fires on private and state lands where there had been no existing fire protection, and can become authorized to respond on federal lands as well. Oregon has a robust network of 23 RFPAs covering over 16 million acres of rangeland.[49]

RFPAs are an increasingly popular model of community fire-based management. The RFFA model harnesses the benefits: members can respond quickly; members possess local knowledge; and members have a strong desire and culture around helping neighbors and protecting livelihoods.[50]

Oregon Department of Forestry (ODF)

ODF provides wildland fire protection to private and other public forestland within Umatilla County. ODF has connection with the RFPAs and agreements with the RFD's.

Umatilla County has worked with the Oregon Department of Forestry on Oregon Senate Bill 360 plan implementation to regulate existing and proposed non-resource zoned development in

[45] Matt Hoehna, ODF, personal communication, 3/29/21

[46] Matt Hoehna, ODF, personal communication, 3/29/21

[47] Matt Hoehna, ODF, personal communication, 3/29/21

[48] Foster, Gordon. Oregon Department of Forestry, *Status of Rangeland Fire Protection Associations*, 2011, http://library.state.or.us/repository/2011/201112200820542/index.pdf, accessed March 2013 and January 2019.

[49] BLM, *Facts at Your Fingertips*, February 2019, https://www.blm.gov/sites/blm.gov/files/documents/files/facts-your-fingertips-feb-2019.pdf.

[50] Davis, Emily Jane "EJ," *Fire Adapted Communities on the Range: Why Rangeland Fire Protection Districts Matter*, June 21, 2018, https://fireadaptednetwork.org/fire-adapted-communities-on-the-range-why-rangeland-fire-protection-associations-matter/.

wildlands urban interface areas. The program is designed to promote defensible space and fire free areas around structures.

ODF's firefighting policy is to put out fires quickly at the smallest possible size. Most of the lands protected by the agency are working forests that produce revenue and support jobs. It is crucial to prevent fire damage to the timber resource that is an essential element of Oregon's economy. This aggressive approach to firefighting also safeguards ecosystem values such as fish and wildlife habitats (https://www.oregon.gov/odf/fire/pages/default.aspx).

According to the ODF website, under the About the Fire Program page,

> "As Oregon's largest fire department, ODF's Fire Protection program protects 16 million acres of forest, a $60 billion asset. These lands consist of privately owned forests as well as some public lands, including state-owned forests and, by contract, US Bureau of Land Management forests in western Oregon. ODF is also part of an extensive fire protection network that includes landowner resources, contract crews and aircraft, inmate crews, and agreements with public agencies across Oregon, the US and British Columbia."

U.S. Forest Service (USFS)

The USFS owns 20% of the federally owned land in Umatilla County.[51] The USFS has a fuel-loading program to assess fuels and reduce hazardous buildup on U.S. forestlands. The USFS is a cooperating agency and, it has an interest in preventing fires in the WUI, as fires often burn up the hills and into the higher elevation U.S. forestlands.

The USFS and other federal, tribal, state, and local government agencies work together to respond to tens of thousands of wildfires annually. Each year, an average of more than 73,000 wildfires burn about 7 million acres of federal, tribal, state, and private land and more than 2,600 structures[52].

The USFS recognizes the wildland fire management environment has profoundly changed. Longer fire seasons; bigger fires and more acres burned on average each year; more extreme fire behavior; and wildfire suppression operations in the WUI have become the norm. To address the challenges, the USFS and its federal, tribal, state, and local partners have developed and are implementing a *National Cohesive Wildland Fire Management Strategy* that has three key components: Resilient Landscapes, Fire Adapted Communities, and Safe and Effective Wildfire Response.[53]

https://www.fs.fed.us/managing-land/fire

Bureau of Land Management (BLM)

The Bureau of Land Management (BLM) is responsible for "managing public lands for a variety of uses such as energy development, livestock grazing, recreation, and timber harvesting while ensuring natural, cultural, and historic resources are maintained for present and future use." According to their website, the BLM manages 1/10 of the nation's surface area and 30% of the nation's mineral and soils (https://www.blm.gov/about/our-mission).

[51] Oregon Wildfire Risk Explorer, *Umatilla County Advanced Report*, 3/16/21

[52] USFS, *Wildland Fire*, https://www.fs.fed.us/managing-land/fire

[53] Ibid.

In Oregon, BLM is responsible for fire protection for all federal agencies. They also provide fire protection on Department of State Lands (DSL) land and on some Oregon State Parks' lands. BLM has a memorandum of agreement with Oregon to provide support to the Rangeland Fire Protection Associations (RFPA).[54]

There is a new program through the BLM, called the Rural Fire Readiness Program. It's a separate cooperative agreement that a RFPA can sign with BLM; it removes them from the statewide memorandum of agreement with Oregon. The cooperative agreement provides more money to the RFPAs for training and equipment.[55] See the descriptions of Rangeland Fire Protection Associations, Oregon Department of Forestry, and the US Forest Service for additional information.

Firewise

Related to wildfire risk, Umatilla County is not part of a formal Firewise program. The Firewise standards are promoted.[56] The County has information on about the Community Wildfire Protection Plans - the *West County CWPP* (2006), the *Blue Mountains and Foothills Region CWPP* (2005), and the *Mill Creek and Walla Walla County CWPP* (2017) – on their website. http://www.co.umatilla.or.us/planning/Planning_Documentss.html

Developed by the National Fire Protection Association, the Firewise program features templates to help communities to reduce risk and protect property from the dangers of wildland fires. Along with an interactive, resource rich website full of free materials, the program offers training throughout the nation on utilizing their program.

https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Regional-risks/Wildfire/Firewise-USA

Senate Bill 360

Umatilla County has worked with the Oregon Department of Forestry on Oregon Senate Bill 360 plan implementation to regulate existing and proposed non-resource zoned development in wild lands/urban interface areas. The program is designed to promote defensible space and fire free areas around structures.

Umatilla County Fire Defense Board

The Umatilla County Fire Defense board is made up of the fire chiefs for each structural fire agency within the county. The members elect a Fire Defense Board Chief. Other entities participate on the Fire Defense Board such as ODF, USFS, BLM, RFPA's, and emergency management. Oregon Office of State Fire Marshal (OSFM) provides oversight and guidance to the fire defense board. Information about the fire defense boards can be found on page 24 of this document: https://www.oregon.gov/osp/Docs/Fire-Service-Mobilization-Plan.pdf. Note that the Mobilization Plan is updated every two years. Usually changes are made to the Mobilization Plan after the spring

[54] Al Crouch, BLM, personal communication, March 4, 2019.

[55] Ibid.

[56] Matt Hoehna, ODF, personal communication, 3/29/21.

State Fire Defense Board meeting. Therefore, the link to this Mobilization Plan may be broken during the lifespan of the *2021 Umatilla County NHMP*.[57]

Members of the CWPP group can change based upon numerous factors. CWPP's can be developed for individual communities or a group of communities, or a county. Dependent upon the scale of the CWPP, participation will be vastly different. However, in each case, there are three mandatory decision makers: Local government, local fire department(s), and local state forestry.[58]

If the scale of the CWPP is at a community level, the three entities would be ODF, City government, and City Fire department. For Umatilla County, the three entities are the County Commissioners, ODF, and the Fire Defense Board Chief. More information about CWPP's can be found at this link: https://www.oregon.gov/ODF/Fire/Pages/CWPP.aspx.[59]

Future Changing Conditions/ Climate Change

In the Umatilla County NHMP, there are several locations that describe future changing conditions or climate change as it relates to the natural hazards that impact Umatilla County, the Cities, and the Special Districts. In the order of appearance in the NHMP: the Risk Assessment, the Hazards Annexes, and Appendix E contain this information. Within Appendix E there are two documents, the *Future Climate Projections: Umatilla County* and the *Umatilla County Future Projections Two-Pager Flyer.* Information from these two documents is described in the Air Quality Annex. Documents such as the DEQ *Oregon Air Quality Annual Reports* describe that with climate change we expect more fires in the Pacific Northwest and higher temperature days; resulting in more elevated ozone days.

Wildfire Mitigation Actions

The wildfire (WF) mitigation actions have been identified by the Umatilla County NHMP Steering Committee. See Table 3-1, 2021 Umatilla County NHMP Mitigation Actions for Umatilla County.

The WF mitigation actions have a high priority because the Hazard Vulnerability Assessment (HVA) resulted in WF having a high risk level. The risk score for wildfire was the fifth highest out of the nine identified natural hazards. There are multi-hazard mitigation actions for the NHMP and several of those include wildfire related mitigation actions, in conjunction with the other hazards. The multi-hazard mitigation actions are a high priority.

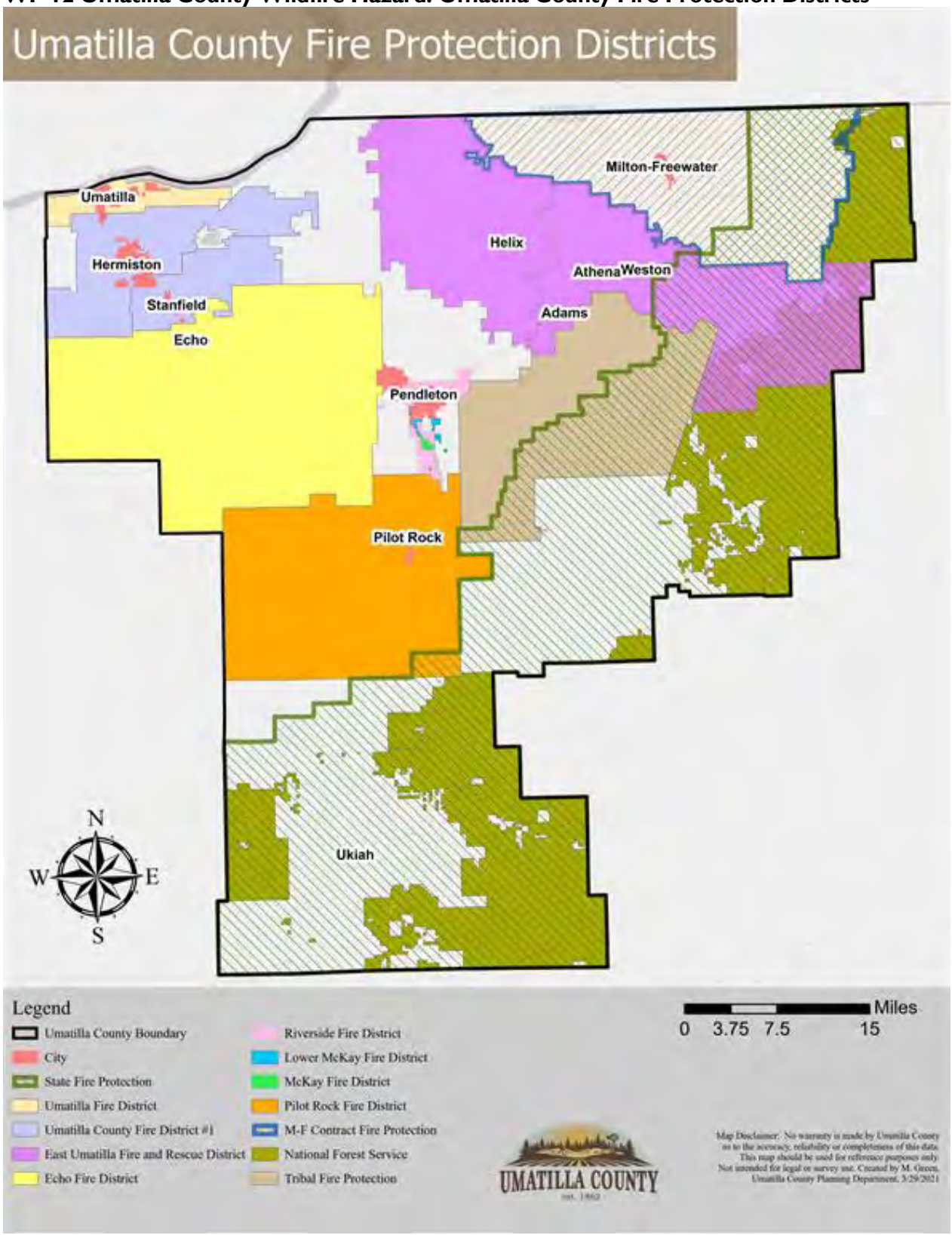
In discussion with the Umatilla County Planning Director, the Umatilla County Emergency Manager, and the NHMP Steering Committee, it was agreed that the risk level rankings from the HVA would be used as the way to prioritize the multi-hazard and hazard-specific mitigation actions. The risk level rankings are in Table 2-4 in Section 2 Risk Assessment.

[57] Dustin Gustaveson, ODF, personal communication 10/19/18 and 1/21/20. Scott Goff, Umatilla County Fire District #1, personal communication, 3/30/21.

[58] Ibid.

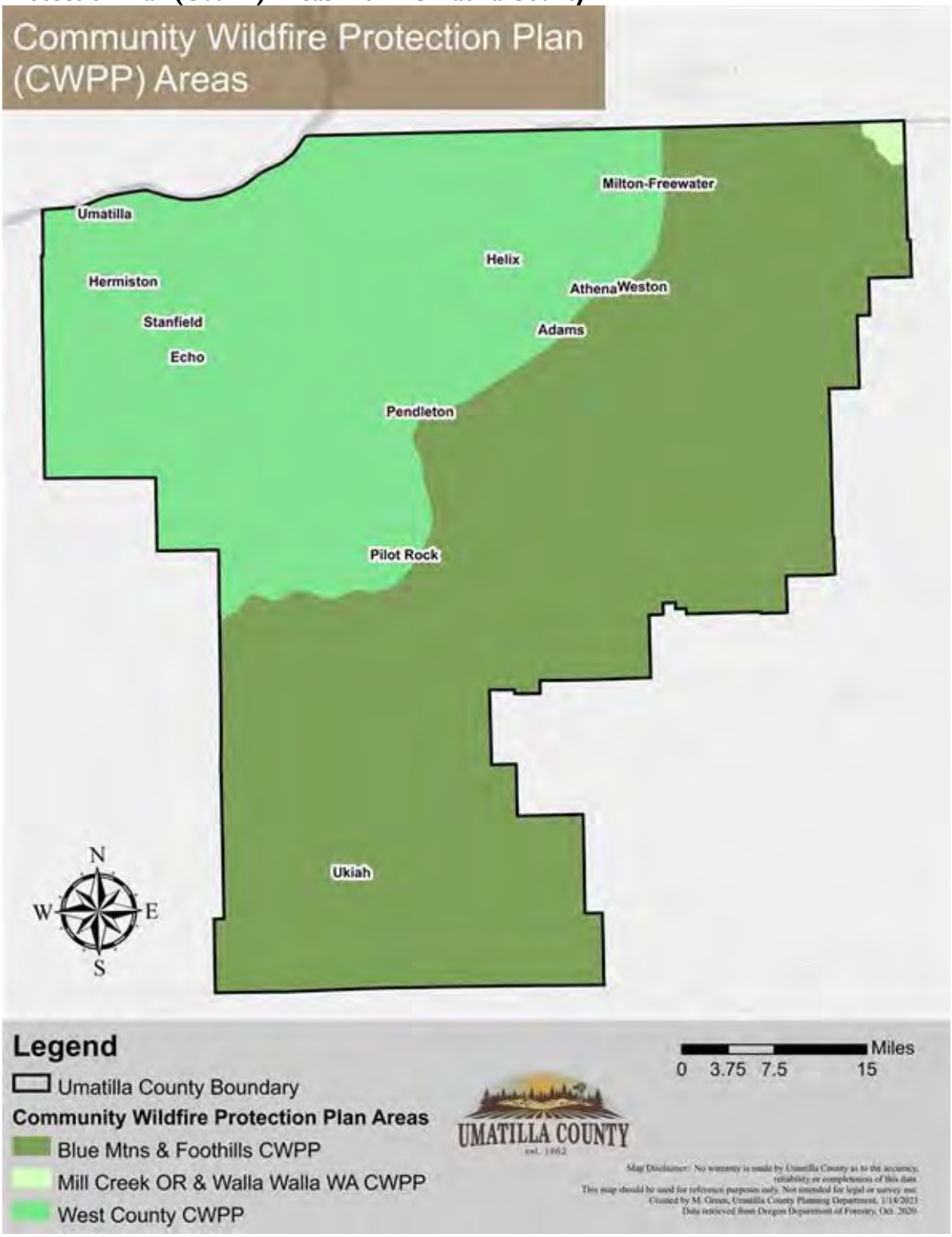
[59] Ibid.

WF-12 Umatilla County Wildfire Hazard: Umatilla County Fire Protection Districts



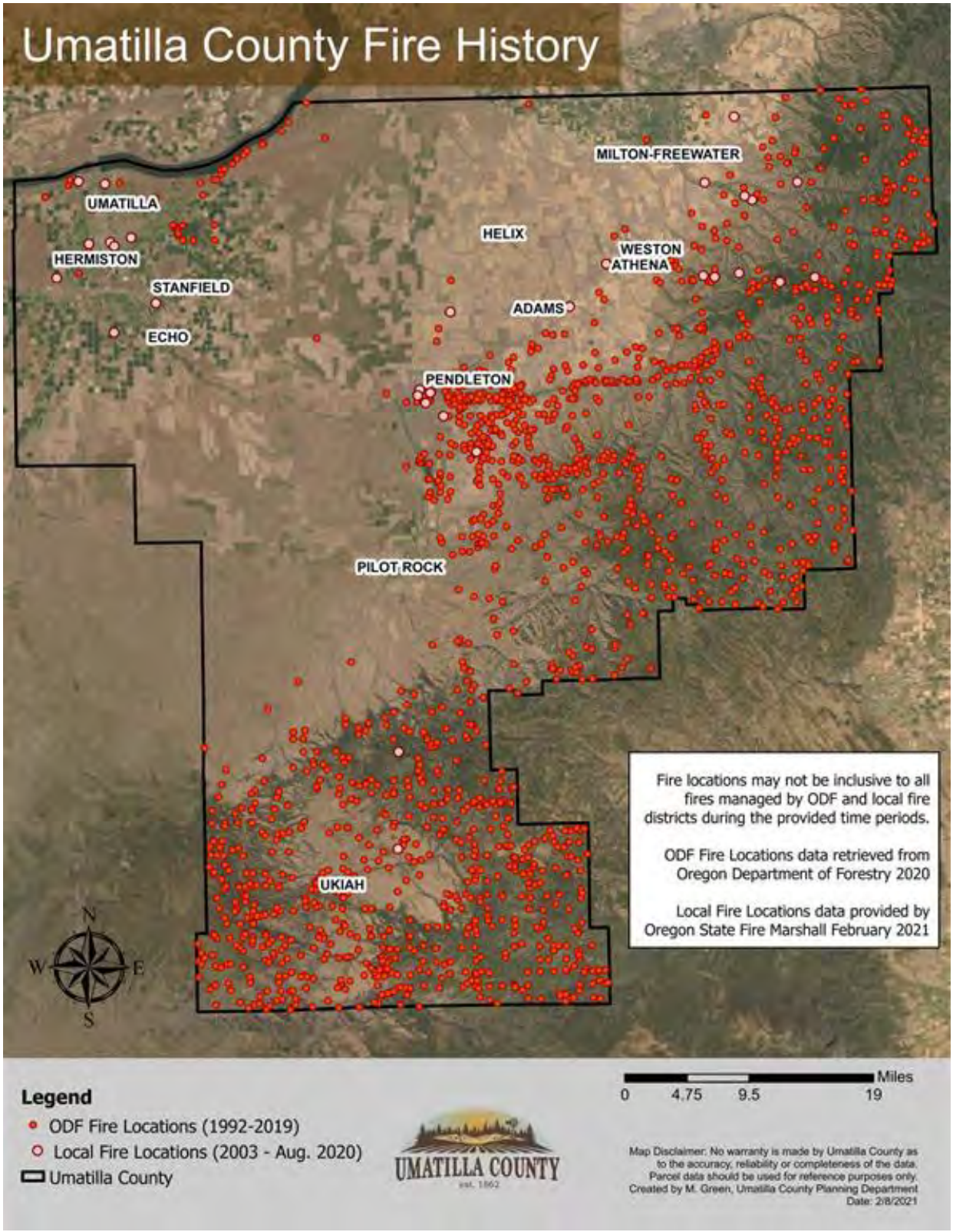
Source: Megan Green, Umatilla County, 3/29/21

WF-13 Umatilla County Wildfire Hazard: Umatilla County Community Wildfire Protection Plan (CWPP) Areas within Umatilla County



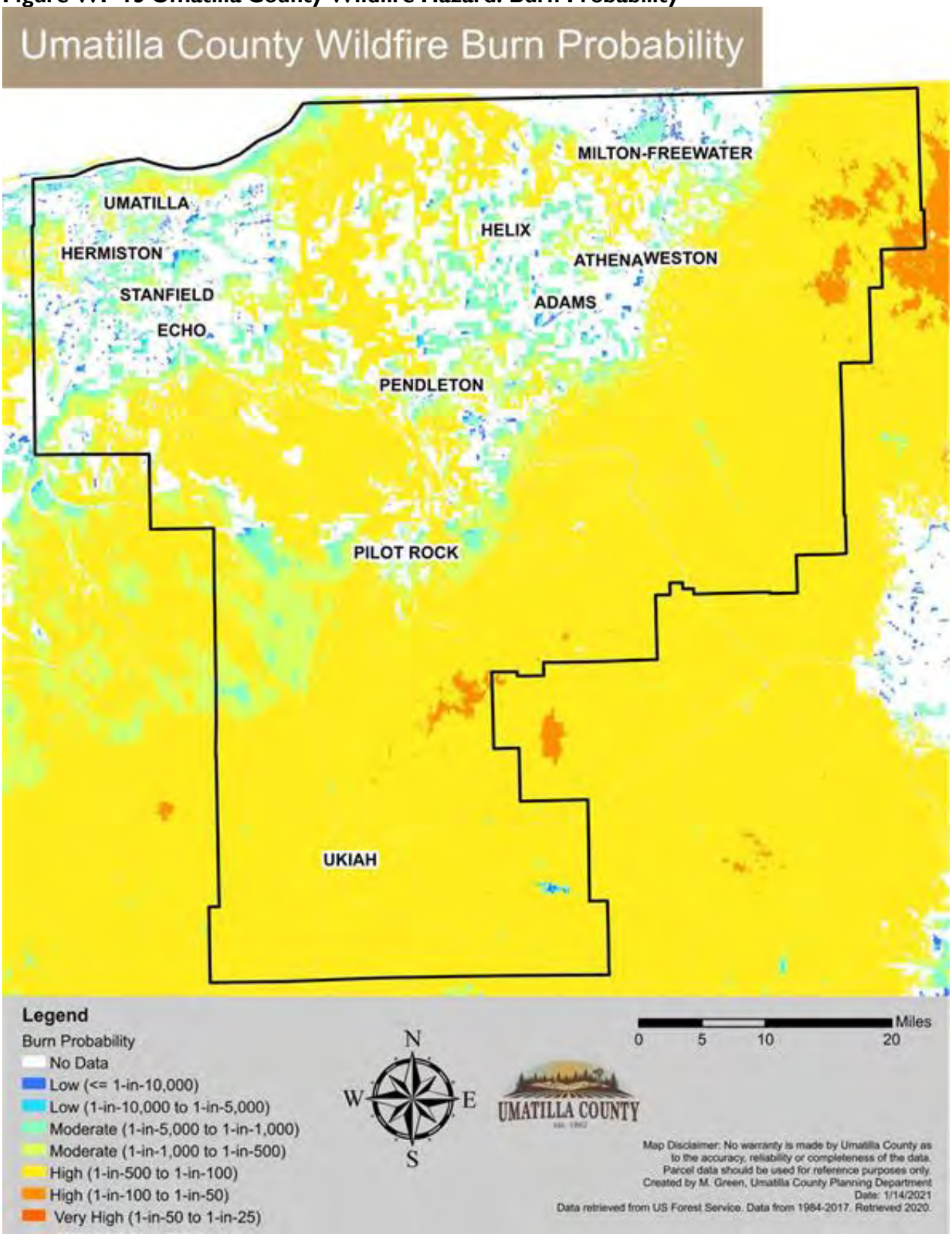
Source: Megan Green, Umatilla County, 1/14/21

Figure WF-14 Umatilla County Wildfire Hazard: Wildfire History



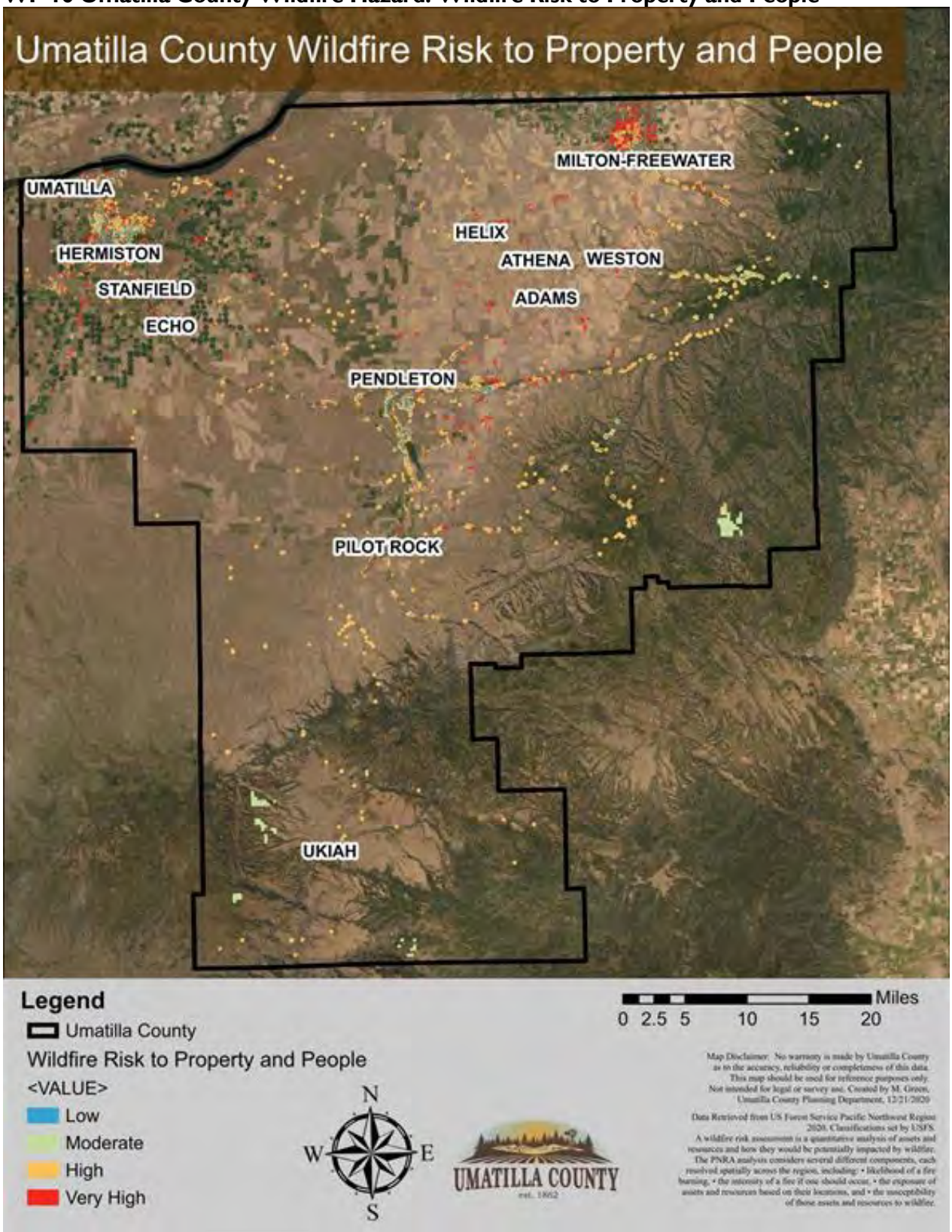
Source: Megan Green, Umatilla County, 2/8/21

Figure WF-15 Umatilla County Wildfire Hazard: Burn Probability



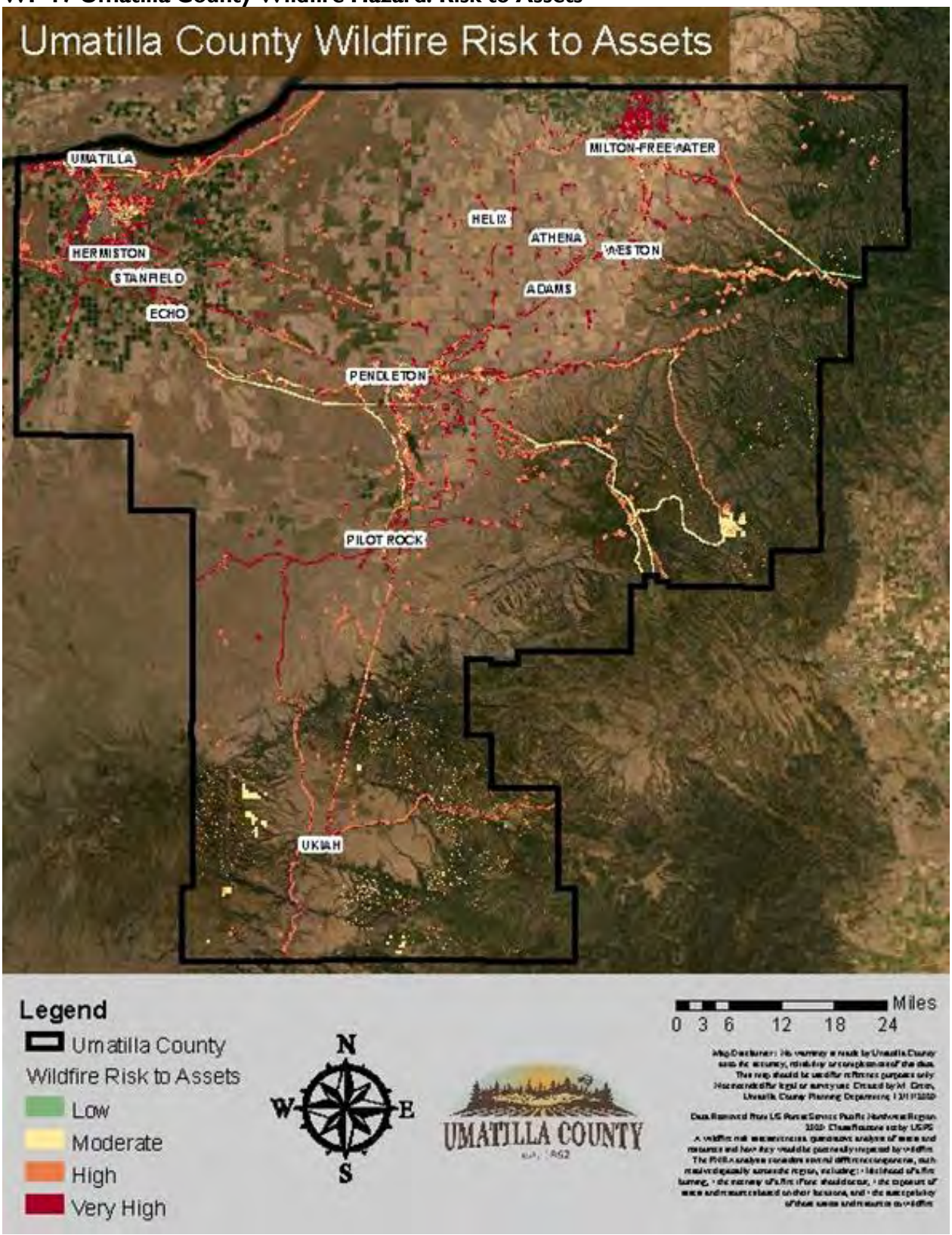
Source: Megan Green, Umatilla County, 1/14/21

WF-16 Umatilla County Wildfire Hazard: Wildfire Risk to Property and People



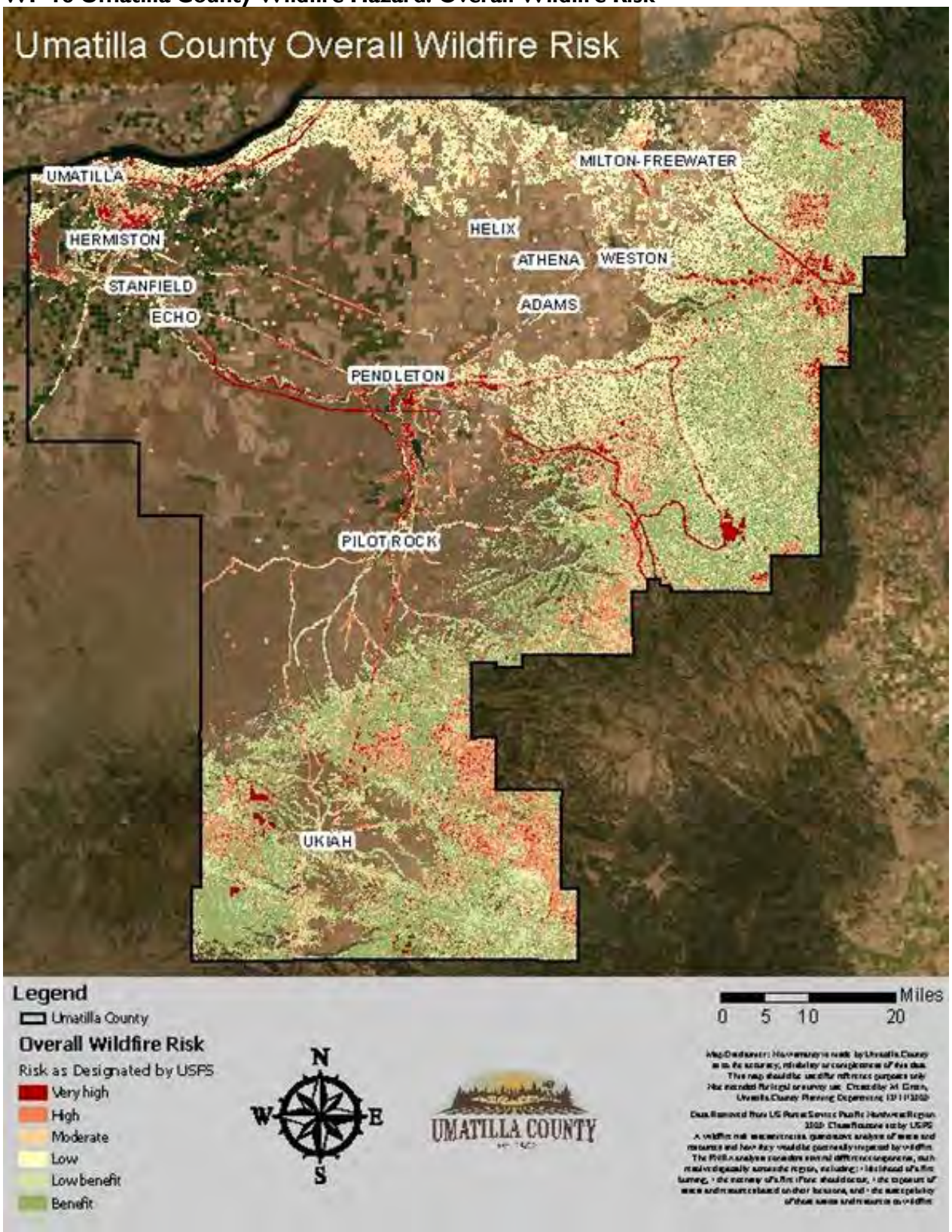
Source: Megan Green, Umatilla County, 12/21/20

WF-17 Umatilla County Wildfire Hazard: Risk to Assets



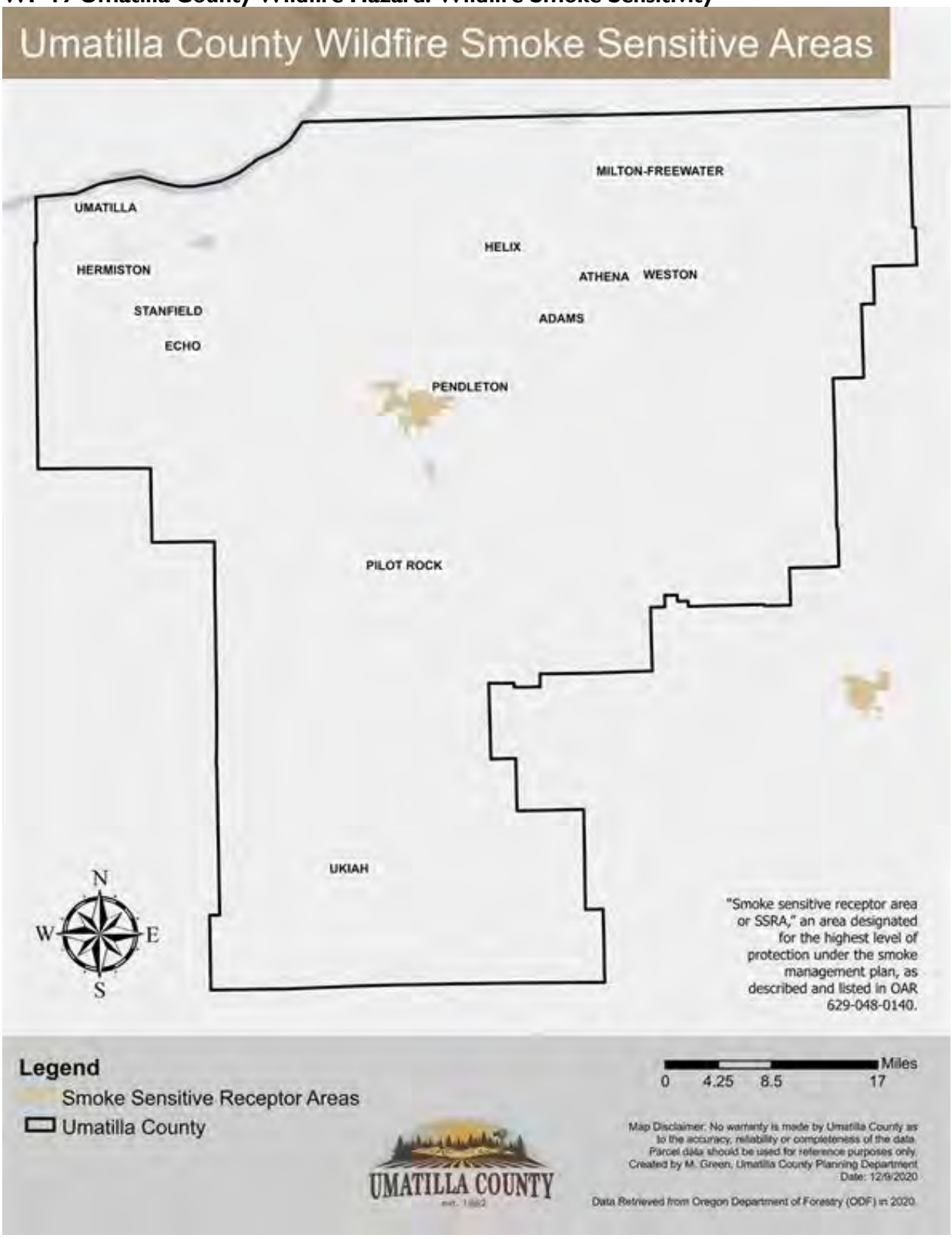
Source: Megan Green, Umatilla County, 12/11/20

WF-18 Umatilla County Wildfire Hazard: Overall Wildfire Risk



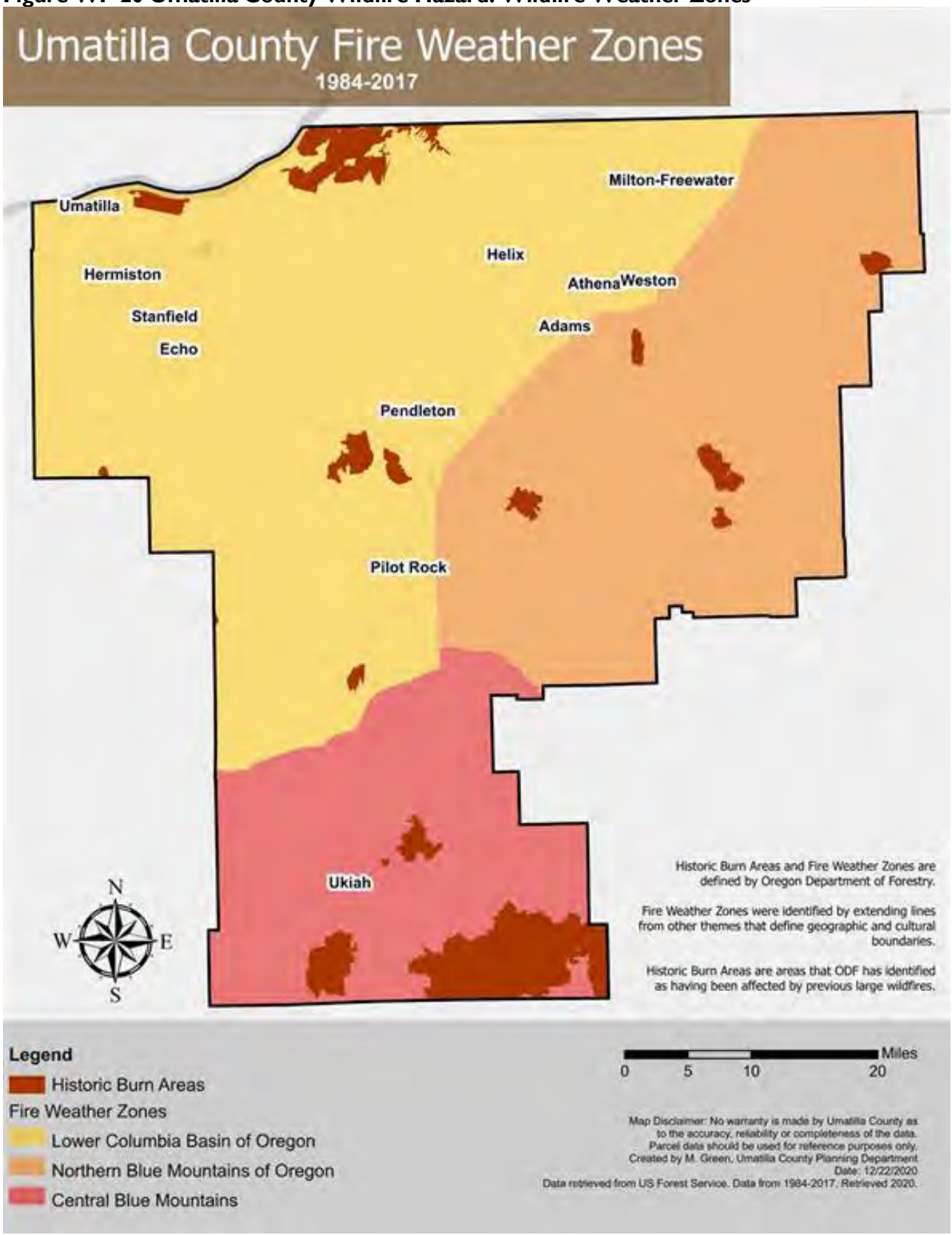
Source: Megan Green, Umatilla County, 12/11/20

WF-19 Umatilla County Wildfire Hazard: Wildfire Smoke Sensitivity



Source: Megan Green, Umatilla County, 12/9/20

Figure WF-20 Umatilla County Wildfire Hazard: Wildfire Weather Zones



Source: Megan Green, Umatilla County, 12/22/20

Drought Hazard Annex

Risk Score: 184

Risk Level: High

Causes and Characteristics of Drought

A drought is a period of drier than normal conditions that results in water-related problems.[1] In the most general sense, drought is defined as a deficiency of precipitation over an extended period of time (usually a season or more), resulting in a water shortage. The effects of this deficiency are often called drought impacts. Natural impacts of drought can be made worse by the demand that humans place on a water supply.[2] Drought is a temporary condition – it is seen in an interval of time, generally months or years, when moisture is consistently below normal.[3] It differs from aridity, which is restricted to low rainfall regions and is a permanent feature of climate. [4]

In the *2014 Umatilla County NHMP*, drought was not ranked in the risk scores of the nine natural hazards. In the Hazard Vulnerability Analysis (HVA) for the *2021 Umatilla County NHMP*, the Steering Committee awarded 184/240 possible points for drought, making it the sixth ranked natural hazard out of the nine identified natural hazards (removed weather emergencies and added air quality).

The National Drought Mitigation Center (NDMC) categorizes drought into types: meteorological, agricultural, hydrological, socioeconomic, and ecological. The descriptions included below are largely excerpted from the definitions on the NDMC's website.[5] Oregon's *Emergency Operations Plan* includes the *Incident Annex for Drought*; all the drought types except ecological are described in that document. The *2020 Oregon Natural Hazards Mitigation Plan* (*2020 Oregon NHMP*) also includes all the drought types except ecological.

Meteorological or Climatological Droughts

Meteorological droughts are defined in terms of the departure from a normal precipitation pattern and the duration of the event. These are region specific since the atmospheric conditions that result in deficiencies of precipitation are highly variable from region to region. This drought type may relate specific precipitation departures to average amounts on a monthly, seasonal, or yearly basis.

[1] Moreland, A. USGS, *Drought. Open File Report 93-642*, 1993, https://pubs.er.usgs.gov/publication/ofr93642.

[2] National Drought Mitigation Center, *Drought Basics.* https://drought.unl.edu/Education/DroughtBasics.aspx, accessed January 24, 2019.

[3] National Drought Mitigation Center, *Types of Drought*, https://drought.unl.edu/Education/DroughtIn-depth/TypesofDrought.aspx, accessed January 24, 2019.

4 National Drought Mitigation Center, *Types of Drought*, https://drought.unl.edu/Education/DroughtIn-depth/TypesofDrought.aspx, accessed January 24, 2019.

[5] Ibid.

Agricultural Droughts

Agricultural drought links various characteristics of meteorological or hydrological drought to agricultural impacts, focusing on precipitation shortages, differences between actual and potential evapotranspiration, soil water deficits, and reduced groundwater or reservoir levels. Plant water demand depends on prevailing weather conditions, biological characteristics of the specific plant, its stage of growth, and the physical and biological properties of the soil. A good definition of agricultural drought accounts for the variable susceptibility of crops during different stages of crop development, from emergence to maturity.

Hydrological Droughts

Hydrological droughts refer to deficiencies in surface water and sub-surface water supplies. It is measured as stream flow, and as lake, reservoir, and ground water levels. When precipitation is reduced or deficient over an extended period of time, the shortage will be reflected in declining surface and sub-surface water levels. Hydrological droughts are usually out of phase with the occurrence of meteorological and agricultural droughts. It takes longer for precipitation deficiencies to show up in components of the hydrological system such as soil moisture, streamflow, and groundwater and reservoir levels. As a result, these impacts are out of phase with impacts in other economic sectors. Also, water in hydrologic storage systems (e.g., reservoirs, rivers) is often used for multiple and competing purposes (e.g., flood control, irrigation, recreation, navigation, hydropower, and wildlife habitat), further complicating the sequence and quantification of impacts. Competition for water in these storage systems escalates during drought and conflicts between water users increase significantly.

Socioeconomic Droughts

Socioeconomic definitions of drought associate the supply and demand of some economic good with elements of meteorological, hydrological, and agricultural drought. It differs from the aforementioned types of drought because its occurrence depends on the time and space processes of supply and demand to identify or classify droughts. The supply of many economic goods, such as water, forage, food grains, fish, and hydroelectric power, depends on weather. Because of the natural variability of climate, water supply is ample in some years but unable to meet human and environmental needs in other years. Socioeconomic drought occurs when the demand for an economic good exceeds supply as a result of a weather-related shortfall in water supply.

In most instances, the demand for economic goods is increasing as a result of increasing population and per capita consumption. Supply may also increase because of improved production efficiency, technology, or the construction of reservoirs that increase surface water storage capacity. If both supply and demand are increasing, the critical factor is the relative rate of change. Is demand increasing more rapidly than supply? If so, vulnerability and the incidence of drought may increase in the future as supply and demand trends converge.

Ecological Droughts

A more recent effort focuses on ecological drought, defined as "a prolonged and widespread deficit in naturally available water supplies — including changes in natural and managed hydrology — that create multiple stresses across ecosystems."[6]

Oregon's Drought Planning and Monitoring

The State of Oregon's *Emergency Operations Plan* (EOP), dated April 2017, includes an *Incident Annex for Drought*, dated January 2016. The drought types included there are meteorological, agricultural, hydrological, and socioeconomic. The *Incident Annex for Drought* describes the way a drought is determined in Oregon. A brief description is included here.

> "To trigger specific actions from the Water Resources Commission and the Governor, a "severe and continuing drought" must exist or be likely to exist. Oregon relies upon two inter-agency groups to evaluate water supply conditions, and to help assess and communicate potential drought-related impacts. The Water Supply Availability Committee (WSAC) is a technical committee chaired by the Water Resources Department. The other group—the Drought Readiness Council—is a coordinating body of state agencies co-chaired by the Water Resources Department and the Office of Emergency Management."[7]

The WSAC utilizes the Surface Water Supply Index (SWSI). The SWSI is an index of current water conditions throughout the state. The index utilizes parameters derived from snow, precipitation, reservoir and streamflow data. The data is gathered each month from key stations in each basin. The lowest SWSI value, -4.1, indicates extreme drought conditions. The highest SWSI value, +4.1, indicates extreme wet conditions. The mid-point is 0.0, which indicates a normal water supply.[8] Additional information can be found on the Natural Resource Conservation Service's website; https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/snow/waterproducts/?cid=stelprdb1244919.

The following are indicators used by the WSAC for evaluating drought conditions:

- Snowpack,
- Precipitation,
- Temperature anomalies,
- Long range temperature outlook,
- Long range precipitation outlook,
- Current stream flows and behavior,
- Spring and summer streamflow forecasts,
- Ocean surface temperature anomalies (El Nino, La Nina),
- Storage in key reservoirs,
- Soil and fuel moisture conditions, and
- NRCS Surface Water Supply Index.[9]

[6] National Drought Mitigation Center, *Types of Drought*, https://drought.unl.edu/Education/DroughtIn-depth/TypesofDrought.aspx, accessed July 31, 2019.

[7] State of Oregon, *Emergency Operations Plan*, *Incident Annex for Drought*, April 2016, https://www.oregon.gov/oem/Documents/2015_OR_EOP_IA_01_drought.pdf.

[8] Barry Norris, Administrator, Technical Services Division, Water Resources Department, Planning for Drought, 2001.

[9] State of Oregon, *Emergency Operations Plan*, *Incident Annex for Drought*, April 2016, https://www.oregon.gov/oem/Documents/2015_OR_EOP_IA_01_drought.pdf.

In the *2020 Oregon Natural Hazards Mitigation Plan* (*2020 Oregon NHMP*), it describes the eight Oregon Natural Hazard Regions (which are different from the climatic regions shown in Figure DR-2). It also notes that "Going forward, drought indices that can account for a changing climate, such as the Standard Precipitation-Evapotranspiration Index (SPEI), may provide a more accurate estimate of future drought risks."[10]

As described in the *2020 Oregon NHMP*, Umatilla County is part of Oregon Natural Hazard Region 5 Mid-Columbia which includes: Gilliam, Hood River, Morrow, Sherman, Umatilla, and Wasco Counties. Droughts are common in Region 5, particularly within Gilliam, Morrow, and Sherman Counties. Agricultural industries in the region are vulnerable to scarcity of water supplies during drought events. Region 5 is largely rural, with urban development occurring in communities along I-84 in Hood River and Umatilla Counties.[11] Besides the agriculture and the economy, the *2020 Oregon NHMP* also describes impacts of droughts on the environment, population, infrastructure, critical/essential facilities, and state-owned and operated facilities.

Since 1991, Umatilla County has been under an emergency drought declaration from the Governor of Oregon on six occasions: 1992, 1994, 2002, 2003, 2005, and 2015. These drought declarations generally included multiple other counties in the region or across Oregon in addition to Umatilla County. See the History of Drought in Umatilla County and Table DR-1 Significant Historic Drought Events for more details on how many drought events have occurred.

History of Drought in Umatilla County and Oregon

Quantifying drought requires an objective criterion for defining the beginning and end of a drought period. The Palmer Drought Severity Index is most effective in determining long-term drought — e.g. several months — and is not as good with short-term forecasts, e.g. a matter of weeks.

As described in the *2020 Oregon NHMP*, "Most federal agencies use the Palmer Method which incorporates precipitation, runoff, evaporation, and soil moisture. However, the Palmer Method does not incorporate snowpack as a variable. Therefore, it is does not provide a very accurate indication of drought conditions in Oregon and the Pacific Northwest, although it can be very useful because of its long-term historical record of wet and dry conditions."[12]

The *2020 Oregon NHMP* further describes, "With climate change, snow droughts—the type of drought in which snowpack is low, but precipitation is near normal—are expected to occur more often. The 2015 drought in Oregon was a "snow drought" and serves as a good example of what future climate projections indicate may become commonplace by mid-21st century (Dalton, Dello, Hawkins, Mote, & Rupp, 2017). Going forward, drought indices that can account for a changing climate, such as the Standard Precipitation-Evapotranspiration Index (SPEI), may provide a more accurate estimate of future drought risks."

[10] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

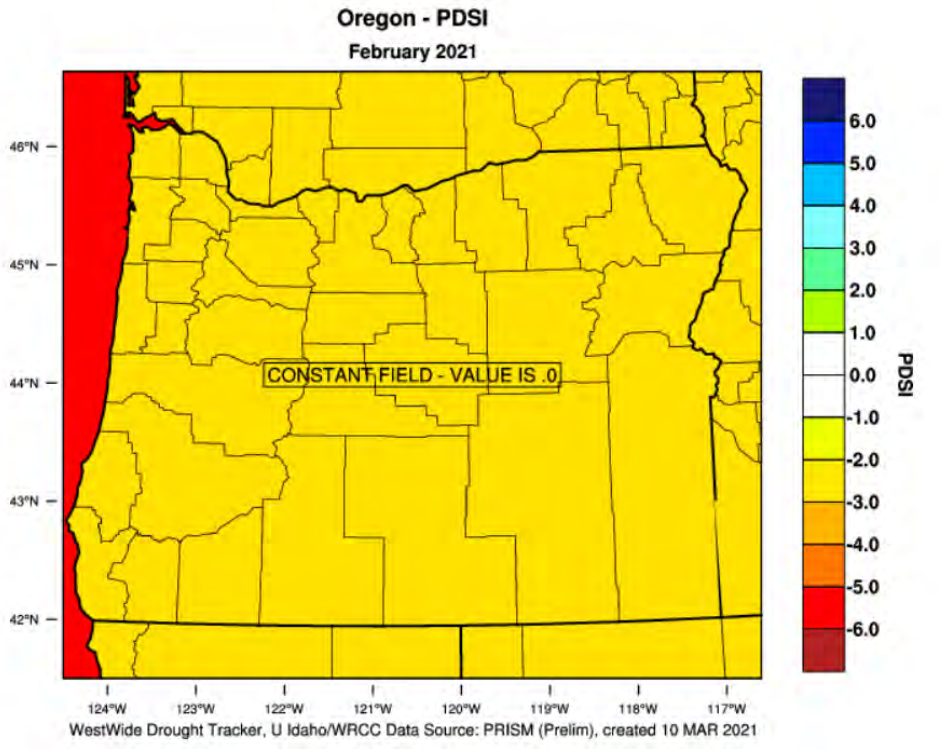
[11] Ibid.

[12] Ibid.

The Palmer Method or Palmer Drought Severity Index (PDSI) indicates the prolonged and abnormal moisture deficiency or excess. It indicates general conditions and not local conditions caused by isolated rain. The PSDI is an important climatological tool for evaluating the scope, severity, and frequency of prolonged period of abnormally dry or wet weather. It can be used to delineate disaster areas and indicate the availability of irrigation water supplies, reservoir levels, range conditions, amount of stock water, and potential intensity of forest fires.[13]

The PDSI uses readily available temperature and precipitation data to estimate relative dryness. It is a standardized index that spans -10 (dry) to +10 (wet). As it uses temperature data and a physical water balance model, it can capture the basic effect of global warming on drought through changes in potential evapotranspiration. Monthly PDSI values do not capture droughts on time scales less than about 12 months;[14] The PDSI uses a zero (0) as normal, and drought is shown in terms of negative numbers; for example, negative two (-2.00) is moderate drought, negative three (-3.00) is severe drought, and negative four (-4.00) is extreme drought. See Figure DR-1.

Figure DR-1 Oregon Counties Palmer Drought Severity Index Map for February 2021



Source: West Wide Drought Tracker, Oregon – PDSI, https://wrcc.dri.edu/wwdt/index.php?region=or

Some Oregon droughts were especially significant during the period of 1928 to 1994. The period from 1928 to 1941 was a prolonged drought that caused major problems for agriculture. The only

[13] Oregon Drought Conditions Map – May 13, 2017, https://www.plantmaps.com/interactive-oregon-drought-conditions-map.php

[14] National Center for Atmospheric Research, *The Climate Data Guide: Palmer Drought Severity Index (PDSI),* https://climatedataguide.ucar.edu/climate-data/palmer-drought-severity-index-pdsi

area spared was the northern coast, which received abundant rains in 1930-33. The three Tillamook burns (1933, 1939, and 1945) were the most significant results of this very dry period.[15]

During 1959-1962 stream flows were low throughout Eastern Oregon, but areas west of the Cascades had few problems. The driest period in Western Oregon was the summer following the benchmark 1964 flood. Low stream flows prevailed in Western Oregon during the period from 1976-81, but the worst year, by far, was 1976-77, the single driest year of the century. The Portland airport received only 7.19 inches of precipitation between Oct. 1976 and Feb. 1977, only 31% of the average 23.16 inches for that period. The 1985-94 drought was not as severe as the 1976-77 drought in any single year, but the cumulative effect of ten consecutive years with mostly dry conditions caused statewide problems.[16]

The peak year of the drought was 1992, when a drought emergency was declared for all of Oregon. Forests throughout the state suffered from a lack of moisture. Fires were common and insect pests, which attacked the trees, flourished.[17] In 2001, 2002, and 2003 Oregon experienced drought conditions, and in 2005, 2008, 2014, 2015, 2018 and 2020. In addition to drought declarations by the State, the United States Department of Agriculture (USDA) can issue drought declarations. The USDA declarations provided access to emergency loans for crop losses.[18]

Table DR-1 Significant Historic Drought Events

Date	Location	Description
1094-05	Statewide	Drought period of about 18 months.
1917-31	Statewide	Very dry period punctuated by brief wet spells (1920, 1927). The 1920s and 30s were commonly known as the Dust Bowl.
1939-41	Statewide	Three-year intense drought.
1959-1964	Eastern Oregon	Streamflows were low throughout eastern Oregon.
1965-68	Statewide	Three-year drought following the big regional floods of 1964-65.
1976-77	Statewide	EM-3039. Oregon Drought. Declared April 29, 1977. Brief very intense statewide drought. There were significant impacts to agriculture.
1991	Statewide	Governor declared drought in 10 counties via several Executive Orders.
1992	Statewide	Governor declared drought (Executive Order 92-21) in many counties, including Umatilla, Harney, Lake, and Malheur, for September - October.
1994	Statewide	Governor declared in multiple counties, including Umatilla County (Executive Order 94-17).
1985-94	Statewide	Generally dry period, with statewide droughts in 1992 and 1994. In 1994, the Governor declared drought in 11 counties in regions 4, 5, 6, 7, and 8.
2002	Statewide	Governor declared in multiple counties, including Umatilla County (Executive Order 02-03).
2003	Statewide	Governor declared in multiple counties, including Umatilla County (Executive Order 03-07).
2001-2003	Statewide	Governor declared drought (Executive Order 01-12) from May 2001 through June 2003 (additional Executive Orders 01-05, 02-21, 02-03, 03-

[15] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

[16] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

[17] Ibid.

[18] Ibid.

Date	Location	Description
		05, and 03-07) in 18 counties including: Umatilla, Malheur, Harney, Lake, Hood River, Wasco, Sherman, and Gilliam.
2004	Eastern Oregon	Governor declared drought (Executive Orders) for Morrow, Baker, Klamath, and Malheur Counties.
2005	Statewide	Governor declared in multiple counties, including Umatilla County (Executive Order 05-05).
2005	Statewide	Governor declared drought (Executive Orders) for Baker, Crook, Deschutes, Gilliam, Hood River, Klamath, Lake, Morrow, Sherman, Umatilla (Executive Order 05-05), Wallowa, Wasco, and Wheeler Counties.
2007	Several counties	Governor declared drought for Harney (Executive Order 07-10), Malheur (Executive Order 07-11), and Lake (07-16) County and three other counties (other Executive Orders). Lake County named a Contiguous County from Harney County.
2010	Region 6	Governor declared drought (Executive Order 10-03) for Klamath County and contiguous counties such as Lake County
2012	Region 6	Governor declared drought (Executive Order 12-15) for Lake and Klamath Counties, specific to the Lost River Basin. Federal Secretary of Agriculture Drought Declaration.
2013	Eastern Oregon	Five counties affected by drought declarations (Executive Orders 13-05, 13-06, 13-09): Gilliam, Morrow, Klamath, Baker, and Malheur.
2014	Regions 4, 6-8	Governor declared drought in 10 counties (via several Executive Orders). This was the third driest Nov.-Jan. period since 1895. State drought declarations: Baker, Crook, Grant, Harney, Jackson, Josephine, Klamath, Lake, Malheur and Wheeler counties. USDA drought disaster declarations: Baker, Benton, Coos, Crook, Curry, Deschutes, Douglas, Grant, Harney, Jackson, Jefferson, Josephine, Klamath, Lake (Ex Order 14-01), Lane, Lincoln, Linn, Malheur, Morrow, Umatilla, Union, Wallowa and Wheeler counties.
2015	Statewide	Governor declared drought for Umatilla County
2015	Statewide	Governor declared drought for Umatilla County (Executive Order 15-05), Harney County (Executive Order 15-03), Lake and Malheur Counties (Executive Order 15-02), and others (via other Executive Orders) in 2015.
2018	Statewide	Governor declared drought in eleven counties.
2020	Statewide	Governor declared drought in fifteen counties.

Sources: University of Oregon, 2014 Umatilla County NHMP; 2020 Oregon NHMP; FEMA, Disaster Declarations for Oregon, retrieved 2021. The Oregonian, http://www.oregonlive.com/weather/index.ssf/2014/09/oregon_drought_not_much_relief.html; Oregon Water Resources Department Public Declaration Report http://apps.wrd.state.or.us/apps/wr/wr_drought/declaration_status_report.aspx, Haberman, Margaret (September 15, 2014). The Oregonian. http://www.oregonlive.com/weather/index.ssf/2014/09/oregon_drought_not_much_relief.html; Taylor and Hatton, 1999.

In addition to the surface water drought, the western part of Umatilla County has had approximately 104,000 acre-feet of groundwater rights curtailed due to groundwater declines. These groundwater declines have directly impacted fisheries, the aquatic environment, economic development and long-term rural and urban economic security. A chronological water history of Umatilla County is in Table DR-2 as excerpted from the *2014 Umatilla County NHMP*.[19]

Table DR-2 Umatilla County Water Chronology from 2014 Umatilla County NHMP

Year	Description of Event
1855	Treaty with the Walla Walla, Cayuse and Umatilla Tribes and the United States government -- treaty reserved rights for tribes to hunt, fish and gather traditional foods
1859	Treaty ratified by Congress
1862	Irrigation begins in Umatilla County

[19] *2014 Umatilla County NHMP*

1880-920	population increase
1890	Umatilla Meadows and Butter Creek Canal Company organized to enlarge and extend ditch diverting water from Umatilla River to irrigate land across the river from Echo -- becomes Hinkle Ditch Company
1893	Intention of Water Use (first State of Oregon water allocation law)
1903	Bureau of Reclamation (BOR) begins investigations to determine feasibility of irrigating lands around the Umatilla River
1903	Gaging station established on Umatilla River -- two miles upstream from mouth of the river
1903	Hinkle Ditch Company begins irrigating land south and east of Hermiston by diverting water from Umatilla River
1905	Furnish Ditch Company begins construction of system to irrigate several thousand acres near Stanfield by diverting water from Umatilla River
1906	BOR construction of projects begins after Congressional approval
1908	Winters v. United States (legal basis for reserved water rights for tribes)
1908	Hermiston Irrigation District created
1908	Cold Springs Dam and Reservoir, Feed Canal Diversion Dam and Feed Canal completed -- to supply supplemental irrigation water to the Hermiston Irrigation District
1909	Furnish Dam completed
1912	Maxwell Diversion Dam completed
1913-17	Three Mile Falls Diversion Dam and West Extension Main Canal built to provide water to West Extension Irrigation District
1916	Adjudicated decree of water rights to use waters of Umatilla River and its tributaries (1953 supplemental findings and order of determination identified inchoate rights to be allowed)
1917	West Extension Irrigation District created
1920 - 1940	Population and economic decline (summer water shortages and soils unsuited for irrigation). Decline in irrigated acreage continued until 1949, when trend reversed
1925	First well (125 feet) in Butter Creek area
1926	State fish and wildlife experts report that there were no Chinook or Coho left in the Umatilla River
1927	McKay Dam and Reservoir completed -- to supplement water supplies for Stanfield and Westland Irrigation Districts
1938	Bonneville Dam completed
1940	BOR Pendleton Project initiated
1940-2000	Population increase due to Federal projects (Umatilla Depot, McNary Dam construction) and manufacturing/processing plants
1949 - 1959	Alfalfa production increases 45% (more irrigated alfalfa and less non-irrigated hay land)
1950s	Irrigation from groundwater begins
1951	BOR report on McNary Gravity Investigation concluded to no irrigation facilities were required in McNary Dam and recommended additional study of potential irrigation development areas in the Plymouth Bench area
1952	First deep well (554 feet) in Butter Creek Area (deepened to 840 feet in 1961)
1954	Pendleton Project Investigation by BOR. Identified several plans for storage and utilization of surplus Umatilla River waters. Concluded that potential irrigable land far exceeded available water supply. No plans were financially feasible in terms of full repayments of reimbursable costs within 40 years (report released locally as an information document to aid local planning)
1955	Oregon Groundwater Act: No water rights needed for stock watering, irrigating lawns or non-commercial gardens of 1/2 acre, for single or group domestic purposes not exceeding 15,000 gallons per day , or for single industrial or commercial purpose not to exceed 5,000 gallons per day
1958	First reports of water table decline in Butter Creek area
1959	BOR determines available water storage based on adjudicated rights and permits on the Umatilla River
1960	Groundwater level monitoring begins in Butter Creek area
1960s	Groundwater levels dropping in Battle Creek

1963	BOR report on possible Birch Creek Diversion Unit -- reanalyzed canal plan and concluded construction still unwarranted
1963	OWRD produces map showing location of 480 sub-basin water rights; reports on scarcity of groundwater and minimal recharge
1963	OWRD reports that fish life will probably take an increasing non-consumptive use of water in the Umatilla River
1963	ODFW conducts survey of steelhead and Chinook spawning habitat on the upper Umatilla River
1964	Based on local and state concerns, BOR begins study to provide comprehensive analysis of multiple-purpose development potential on basin-wide scale (results published in 1970)
1964	Oregon Water Resources Commission adopts Umatilla Basin program
1966	Groundwater use for center pivot irrigation begins
1966	Congressional authorization for Secretary of the Interior to conduct feasibility investigation to expand irrigation base and address anadromous fishery needs in the Umatilla Basin
1969	BOR constructs pumping plant on Columbia River to lift water into West Extension Canal
1970	BOR reports that any significant increase in pumping from basalt aquifers would likely result in accelerated decline of water tables
1972	72 irrigation wells in Butter Creek area (depth 665-1500 feet)
1972	Federal Clean Water Act
1973	Oregon Senate Bill 100 signed by Governor McCall. Creates Oregon statewide planning program with the Land Conservation and Development Commission (LCDC) and the Department of Land Conservation and Development (DLCD).
1974	Oregon LCDC adopts 14 statewide planning goals
1974	Eastern Central Oregon Association of Counties completes Regional Water System Feasibility Study for Hermiston-Boardman, Oregon
1975	Port of Umatilla proposes a regional water system based on their permit for the project of 155 cfs from the Columbia River
1976	OWRD designates Butter Creek a Critical Groundwater Area (remanded until 1986)
1976	Critical Groundwater Area designated by OWRD for Ordnance Basalt
1976	Critical Groundwater Area designated by OWRD for Ordnance Gravel
1977	Lost Lake/Depot well owners initiated project to artificially recharge shallow gravel aquifer using existing canal system
1980	CTUIR initiates Umatilla Salmon Recovery Project
1980	ODFW initiates a steelhead supplementation program
1980s	Coalition formed between CTUIR and local irrigators to recover salmon populations -- BOR, BPA, OWRD and ODFW participate
1980	ODFW begins hatchery outplanting program on Umatilla River to supplement natural production
1983	Umatilla County Comprehensive Plan recognizes that availability of water is a key resource for economic growth
1983	ODFW and ODEQ submit minimum stream flow requirements for Umatilla Basin to State Water Resources Board
1984	Umatilla Chemical Depot placed on EPA's National Priorities List because of soil and groundwater contamination
1984	Formation of Umatilla Basin Project Steering Committee
1985	Umatilla River and tributaries withdrawn from further appropriation by Oregon Water Resources Commission and minimal perennial stream flows adopted by Umatilla River and Birch Creek

1985	Umatilla Basin Fish Resource Improvement Committee (UBFRIC) adopts plan. Developed in cooperation with CTUIR, ODFW, National Marine Fisheries Service, Fish and Wildlife Service, BOR and Forest Service (funding for plan from BPA)
1986	Critical Groundwater Area designated by OWRD for Buttercreek Basalt
1986	Report to the Governor, Umatilla Basin Ground Water Task Force (identifies water use concerns and suggests alternatives)
1987	Oregon Instream Water Rights Act -- recognizes instream uses as beneficial
1988	Umatilla Basin Project authorized and funded by Congress (developed by CTUIR and irrigators coalition -- allows irrigators to exchange Umatilla River water for Columbia River water)
1988	Oregon Water Resources Commission approves Oregon Water Plan: Umatilla Basin Sections
1989	Oregon Groundwater Quality Protection Act
1990	Classified Groundwater Area designated by OWRD for Ella Butte (exempt uses only)
1990	ODEQ declares 352,000 acres in Umatilla and Morrow counties as a groundwater management area (GWMA) after discovering elevated levels of nitrates in wells -- leads to the Lower Umatilla Basin GWMA Voluntary Plan
1991	Critical Groundwater Area designated by OWRD for Stage Gulch Basalt
1991	OWRD enforces compliance against waterspreading
1992	Oregon DEQ and EPA conduct sampling to characterize regional groundwater quality -- Lower Umatilla Basin identified as area of elevated nitrate in groundwater
1994	Salmon return to the Umatilla River (first time in seventy years)
1995	Columbia River Intertribal Fish Commission (CRITFC) develops anadromous fish restoration plan for Columbia River Basin
1997	Oregon Plan for Salmon and Watersheds
2003	Umatilla County ranked fifth in state in agricultural commodity sales at $200 million
2003	Oregon Water Resources Department report published -- Ground Water Supplies in the Umatilla Basin
2003	Aquifer Storage and Recovery (ASR) Pilot Testing in for City of Pendleton
2004	Umatilla County Critical Groundwater Task Force created by the Umatilla County Board of Commissioners in order to develop a "2050 Plan" to assure adequate groundwater for broad community needs through the year 2050
2004	Northwest Power and Conservation Council (NWPCC) adopts Umatilla Subbasin Plan
2005	Board of Commissioners of Umatilla County adopt Exempt Well Resolution until 2050 plan is authorized

Source: *2014 Umatilla County NHMP*

Critical Groundwater Areas

Umatilla County contains four separate Critical Groundwater Areas (CGWAs). All four are located in West Umatilla County and span within the cities of Umatilla, Hermiston, Echo, and Stanfield. The CGWAs are named: Butter Creek, Ordinance Gravel, Ordinance Basalt, and Stage Gulch.

There are 22 designated groundwater administrative areas in Oregon, with differing levels of restriction. These include CGWAs, groundwater limited/classified areas, and areas withdrawn from further appropriation. Restrictions vary from time-limited permit restrictions for uses requiring water rights, closed to new appropriations, or those that have well construction requirements to protect senior water rights. Oregon Water Resources Department (OWRD) staff monitor these areas to ensure that the restrictions adequately protect the groundwater resource and existing users.[20]

[20] Oregon Water Resources Department, *Groundwater*, https://www.oregon.gov/OWRD/programs/GWWL/GW/Pages/AdminAreasAndCriticalGWAreas.aspx

There is the Lower Umatilla Basin Groundwater Management Area, which covers most of the critical ground water areas in Umatilla County.

> "In accordance with Oregon's Groundwater Quality Protection Act of 1989, the Oregon Department of Environmental Quality (DEQ) and the Oregon Department of Agriculture (ODA) declared the Lower Umatilla Basin a Groundwater Management Area (GWMA) in 1990 because regional nitrate-nitrogen concentrations exceeded 7 milligrams per liter (mg/L). This area encompasses Morrow and Umatilla counties including Hermiston, Boardman, Irrigon, Stanfield, and Echo, OR. After the GWMA was declared, a 4-year interagency hydrogeological investigation was conducted to determine the extent of contamination and to identify the potential sources of that contamination."[21]

See Figure DR-3 for a map of the CGWAs in Umatilla County.

Crop Land Cover

One of the most impactful consequences for drought is on agriculture. To get an idea of what crops are grown and where in Umatilla County, the Umatilla County staff GIS person prepared a map of crop land cover. This map was generated by CropScape, a mapping program courtesy of the US Department of Agriculture (USDA). The top 20 land cover categories are shown on the map and listed by decreasing acreage. The map was generated and downloaded in PDF format, the PDF was then edited to display Umatilla County's 12 cities and their locations.

See Figure DR-4 for the crop land cover map.

Risk Assessment

How are Hazards Identified?

The extent of the drought depends upon the degree of moisture deficiency, and the duration and size of the affected area. Typically, droughts occur as regional events and often affect more than one city and county. In severe droughts, environmental and economic consequences can be significant.

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Hazard Risk Analysis

The Umatilla County NHMP Steering Committee completed a Hazard Vulnerability Assessment/Analysis (HVA) during this NHMP update. This was described in Section 2 Risk Assessment. The method used for the HVA was developed from a Federal Emergency Management Agency (FEMA) tool that has been refined by the Oregon Office of Emergency Management (OEM). It addresses and weights (shown as percent within parentheses) probability (29%), vulnerability

[21] *Lower Umatilla Basin Groundwater Management Area*, https://lubgwma.org/, accessed 3/11/21

(21%), maximum threat (42%) and the history (8%) of each natural hazard and attributes a final hazard analysis score. The methodology produces scores that range from 24 to 240.

For local governments, conducting the HVA is a useful step in planning for hazard mitigation. The method provides the jurisdiction with a relative ranking from which to prioritize mitigation actions, but does not predict the occurrence of a particular hazard.

In the *2014 Umatilla County NHMP*, drought was not ranked in the risk scores of the nine natural hazards. In the Hazard Vulnerability Analysis (HVA) for the *2021 Umatilla County NHMP*, the Steering Committee awarded 184/240 possible points for drought, making it the sixth ranked natural hazard out of the nine identified natural hazards (removed weather emergencies and added air quality).

For more information on all the risk scores and ranks of the natural hazards, see Volume I Basic Plan, Section 2 Risk Assessment of this NHMP.

Probability Assessment

According to the Probability section for drought that is within the *2020 Oregon NHMP*,

> "Drought is a normal, recurrent feature of climate, although many erroneously consider it a rare and random event. It is a temporary condition and differs from aridity because the latter is restricted to low rainfall regions and is a permanent feature of climate. It is rare for drought not to occur somewhere in North America each year. Despite impressive achievements in the science of climatology, estimating drought probability and frequency continues to be difficult. This is because of the many variables that contribute to weather behavior, climate change, and the absence of historic information."[22]

The *2020 Oregon NHMP* also notes that,

> "a combination of factors increases the likelihood that Oregon will experience increased frequency of one or more types of drought under future climate change. In addition, Oregon is projected to experience an increase in the frequency of summer drought conditions as summarized by the standard precipitation-evaporation index (SPEI) due largely to projected decreases in summer precipitation and increases in potential evapotranspiration (Dalton, Dello, Hawkins, Mote, & Rupp, 2017)."[23]

Vulnerability Assessment

According to the *2020 Oregon NHMP*, "While the communities most vulnerable to drought are all located east of the Cascades, drought occurs and its impacts are felt statewide. We do not have the data to make a quantitative assessment of risk from drought; however, there has been a drought

[22] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

[23] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

event in fourteen of the last twenty years. Qualitatively, the risk of drought in Oregon is at least moderate to high, and likely to become very high in future years."[24]

In Region 5 of Oregon's Natural Hazard Regions, which Umatilla County is part of, "The region's demographic, economic, infrastructure and development patterns indicate that some populations, structures and places may be more vulnerable to certain natural hazards than others. Mitigation efforts directed at these vulnerabilities may help boost the area's ability to bounce back after a natural disaster."[25]

According to the *2020 Oregon NHMP*,

> "Across the region, social vulnerability is driven by fewer college degrees and high numbers of housing rentals and vacancies. Children, persons aged under 18, also represent a vulnerable segment of the population. Region 5 has a higher percentage of children than the state as a whole. In Region 5, the share of people who do not speak English "Very Well" is higher than the statewide estimate—especially for Morrow, Hood River, and Umatilla Counties."

Droughts have many effects, including but not limited to those on lake and river levels, which harms wildlife, farmers, and ranchers. Its effect on forest is less obvious but still impactful. For example, during extended periods of drought trees are weakened by water shortages and tree pests proliferate. Wildfires also often coincide with droughts. The severity of a drought occurrence impacts agricultural and timber losses, property damage, and disruption of water supplies and availability in urban and rural areas. Factors used to assess drought risk include agricultural practices, such as crop types and varieties grown, soil types, topography, and water storage capacity (e.g. behind dams and in reservoirs).[26] In droughts, environmental, infrastructure, critical/essential facilities, state-owned and operated facilities, population, and economic consequences can be significant.

Community Hazard Issues

What is susceptible to damage during a hazard event?

Droughts can happen at any time of the year. Given the breadth of impacts identified in this Drought Annex as possibly resulting from drought, losses from a drought could be extensive and far-reaching. As described in Appendix E Future Climate Projections Report, droughts will continue to occur and shifts in the nature in extent of the droughts are anticipated.

Two main points are noted in the OCCRI report in Appendix E:

- Drought conditions, as represented by low summer soil moisture, low spring snowpack, low summer runoff, and low summer precipitation are projected to become more frequent in Umatilla County by the 2050s relative to the historical baseline.

[24] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

[25] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

[26]Water availability and precipitation are not always correlated; drought conditions affect regions differently than others due to available water supplies.

- By the end of the 21st century, summer low flows are projected to decrease in the Blue Mountains region putting some sub-basins at high risk for summer water shortage associated with low streamflow.[27]

Recall Table DR-1 Significant Historic Drought Events. Drought is a normal, recurrent feature of climate. It is a temporary condition, but its effects can accumulate slowly and last from several months to several years, even well after the termination of the drought itself. Because of this characteristic of drought, it can be difficult to fully quantify the impact of drought upon communities. Additionally, estimating drought probability and frequency is difficult. Oregon lacks long historic databases for drought, many variables contribute to the weather behavior that causes drought, and different regions are affected to varying degrees of severity based on natural features and human infrastructure.

Winter droughts can have a profound impact on agriculture, particularly east of the Cascade Mountains. Also, below average snowfall in higher elevations has a far-reaching effect, especially in terms of hydroelectric power, irrigation, recreational opportunities and a variety of industrial uses. Drought is a significant risk in Umatilla County due to its limited annual rainfall and economic reliance on agriculture and ranching. Agriculture and ranching are heavily dependent on water supply and a complex network of irrigation systems and dams spread throughout the County.

Drought can affect all segments of a jurisdiction's population, particularly those employed in water-dependent activities (e.g., agriculture, hydroelectric generation, recreation, etc.). Also, domestic water-users may be subject to stringent conservation measures (e.g., rationing) and could be faced with significant increases in electricity rates. Facilities affected by drought conditions include irrigation systems, storage systems for potable water, sewage treatment facilities, water storage for firefighting, and hydroelectric generating plants.

There also are environmental consequences. A prolonged drought in forests promotes an increase of insect pests, which in turn, damage trees already weakened by a lack of water. A moisture-deficient forest or grassland constitutes a significant fire hazard (see the Wildfire Hazard Annex). In addition, drought and water scarcity add another dimension of stress to species listed pursuant to the Endangered Species Act (ESA) of 1973.

There are multiple different sources of information that can provide more detailed information about the amount of rainfall and other climate related factors. The Severe Summer Storms and Severe Winter Storms Hazard Annex and the Community Profile in Appendix B contain details about rainfall, snowfall, and temperature.[28] Note that Appendix E Future Climate Projections Reports describe scenarios for the future climate of Umatilla County based on past data and present models.

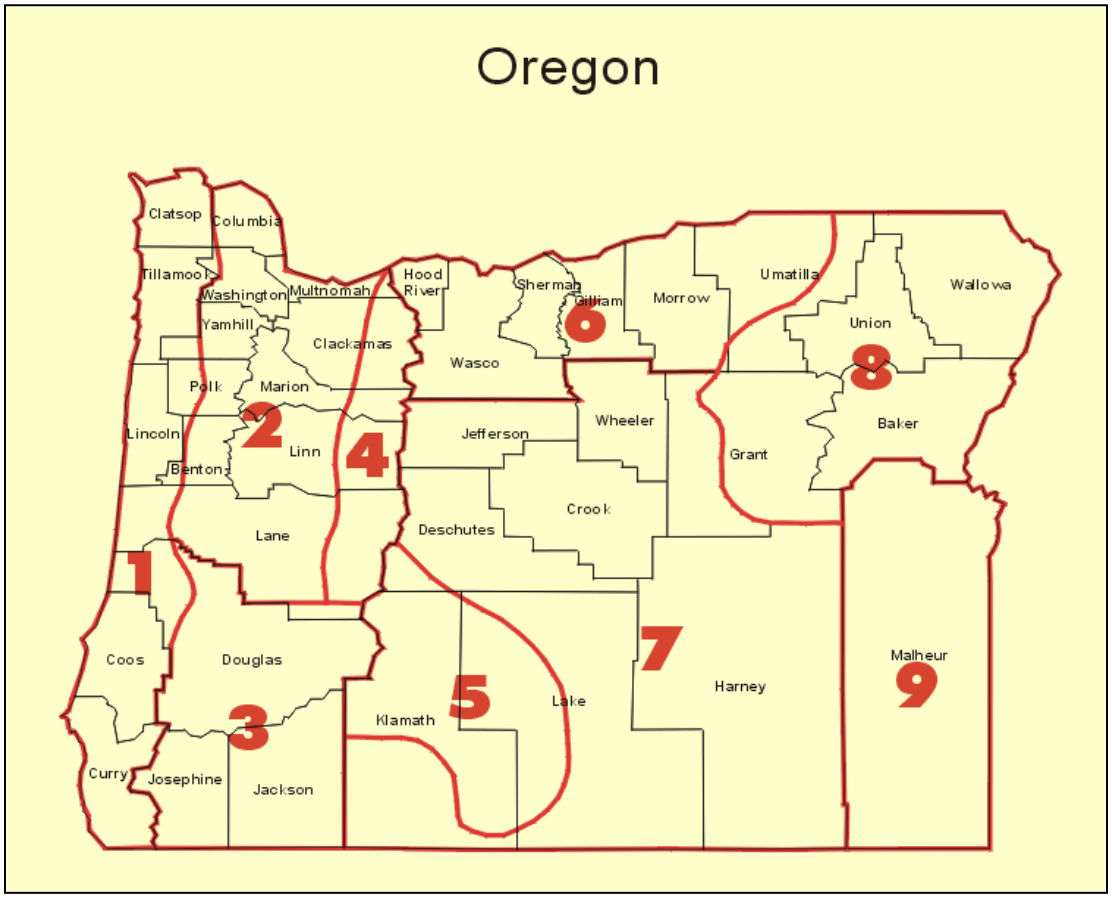
Sometimes when describing climate in Oregon, people refer to the Oregon Climatic Divisions. These divisions are based on the Climate Divisional Dataset maintained by National Oceanic and Atmospheric Administration (NOAA). For many years the dataset was the "only long-term temporally and spatially complete dataset from which to generate historical climate analyses (1895-2013) for the contiguous United States. It was originally developed for climate division, statewide,

[27] OCCRI, Future Climate Projections Report: Umatilla County, October 2020, https://www.oregon.gov/lcd/CL/Documents/Umatilla_County_FutureClimateProjectionsReport_Oct2020.pdf

[28] U.S. Climate Data, Climate Oregon - Temperature, Rainfall and Averages (usclimatedata.com)

regional, national, and population-weighted monitoring of drought, temperature, precipitation, and heating/cooling degree day values. Since the dataset was at the divisional spatial scale, it naturally lent itself to agricultural and hydrological applications."[29] Umatilla County is in Oregon Climate Zones 6 and 8. See Figure DR-2.

Figure DR-2 Map of Climatic Divisions



Source: NOAA, National Weather Service Climate Prediction Center, https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/CLIM_DIVS/oregon.gif

Existing Hazard Mitigation Activities

Government Assistance when Droughts Occur

Once drought conditions have been established, Oregon communities may request government assistance. The mechanism to trigger federal or state assistance is contained in ORS 536.710.

> "1) The Legislative Assembly finds that an emergency may exist when a severe, continuing drought results in a lack of water resources, thereby threatening the availability of essential services and jeopardizing the peace, health, safety and welfare of the people of Oregon.

[29] NOAA National Centers for Environmental Information, *U.S. Climate Divisions*, https://www.ncdc.noaa.gov/monitoring-references/maps/us-climate-divisions.php, accessed 6/25/19.

(2) The Legislative Assembly finds it necessary in the event of an emergency described in subsection (1) of this section, to promote water conservation and to provide an orderly procedure to assure equitable curtailment, adjustment, allocation or regulation in the domestic, municipal and industrial use of water resources where more than one user is dependent upon a single source of supply."[30]

Locally, farmers may apply for assistance only when the state has declared the County a disaster area. The process for such a declaration is as follows: local County Court has passes a resolution declaring the County to be in a "State of Drought Emergency," which is sent to the Oregon Department of Agriculture for review. If the Department deems the County's production losses sufficient, it will request that the Governor designate the County a disaster area, making local farmers eligible for emergency loans and other assistance from the USDA Farm Service Agency. To receive assistance, farmers must provide documentation of crop losses and typical yields; additionally, they are only eligible for funds if this documentation reveals a 35% or greater loss in production due to drought.

Comprehensive cost estimates for droughts in Umatilla County are not kept on record, but a county-wide drought declaration can incur $500,000 – 5,000,000 dollars in disaster assistance payments for farmers from the USDA. Most farmers in the County do not carry drought insurance, according to the USDA Farm Service Agency.[31]

Existing Hazard Mitigation Activities and Resources

National Drought Mitigation Center: Drought Monitor

On the National Drought Mitigation Center website there is a page called US Drought Monitor. It include a map and weekly summary of current drought conditions for each state in the US. There is an intensity and impacts scale that is used to indicate the severity level of conditions; there are five levels. There is also a section called data which provides a variety of statistics. You can select data each week such as percent of area, total area, percent of population and total population. Spatial scale choices include national, state, county and urban areas, and many more.
There is also a Drought Classification page on the website which includes the five levels of severity, and the types of systems used to classify and measure them: the Palmer Drought Severity Index, the CPC Soil Moisture Model, the USGS Weekly Streamflow, the Standardized Precipitation Index, and the Objective Drought Indicator Blends.

https://droughtmonitor.unl.edu/

State Natural Hazard Risk Assessment: Drought

The risk assessment in the *2020 Oregon Natural Hazards Mitigation Plan* provides an overview of drought risk in Oregon and identifies the most significant droughts in Oregon's recorded history. It has overall state and regional information, and includes drought related mitigation actions for the entire state. The link included here is specific to the Risk Assessment for Region 5 Mid-Columbia.
https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_05b_RAState.pdf

[30] State of Oregon, ORS 536.710, https://www.oregonlaws.org/ors/536.710.

[31] Ibid.

Water Resources Commission, Water Supply Availability Committee, and the Drought Readiness Council

As described in the Oregon Drought Planning and Monitoring section, to trigger specific actions from the Water Resources Commission and the Governor, it must be likely that a severe and continuing drought will occur. There are two inter-agency groups that evaluate water supply conditions, and help assess and communicate potential drought-related impacts:

- The Water Supply Availability Committee (WSAC) is a technical committee chaired by the Oregon Water Resources Department (OWRD).
- The Drought Readiness Council is a coordinating body of state agencies co-chaired by the OWRD and the Office of Emergency Management (OEM).

See the State of Oregon's *Emergency Operations Plan, Incident Annex for Drought*, https://www.oregon.gov/oem/Documents/2015_OR_EOP_IA_01_drought.pdf.

Oregon Water Resources Department (ORWD)

OWRD has statutory authority (ORS and OAR) to implement special "drought rules" during times of surface water shortage. These rules allow higher use of supplemental groundwater rights and temporary, emergency water rights transfers to ensure that crops are not lost due to lack of water. While this program works during times of surface water shortages it allows the extended use of groundwater aquifers that are already depleted, some of which have declined over 400 feet.[32]

Umatilla County has a regional office of the ORWD and has a Water Master for District 5. There are two offices for the Water Master, one in Pendleton and one in Milton-Freewater. The regional office is in Pendleton. The Water Master communicates with the public during drought season and other times of the year about responsible water management best practices.

https://www.oregon.gov/OWRD/aboutus/contactus/Pages/RegionalOfficesandWatermastersDirectory.aspx

Natural Resources and Conservation Service -Umatilla County

The Natural Resource and Conservation Service (NRCS) has a service center located in Umatilla County, the Pendleton Service Center. Also listed on the NRCS website for Umatilla County are the Columbia Blue Mountain RC&D Office, the Tiicham Conservation District, and the Umatilla County Soil and Water Conservation District (UCSWCD). The UCSWCD is a plan holder for this *2021 Umatilla County NHMP* (see the Special Acknowledgements and Table of Contents section).

The NRCS offers voluntary technical and financial assistance to private landowners interested in natural resource conservation. The NRCS has historically focused on rangeland and irrigation upgrades to improve surface water quality, improve wildlife habitat, control invasive plants, and conserve groundwater.[33]

[32] *2014 Umatilla County NHMP*

[33] USDA Natural Resources Conservation Service of Oregon, *Umatilla County,* https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/contact/local/?cid=nrcs142p2_046140, accessed 3/11/21.

Of note,

> "NRCS Oregon uses a *Strategic Approach to Conservation* to address priority natural resource concerns in specific watersheds and landscapes across the state. It all begins with a *Long Range Plan*. Each county develops a Long Range Plan with input from landowners, agency partners and other stakeholders that identifies and prioritizes natural resource concerns in the community. Based on those plans, NRCS works with partners to develop local *Conservation Implementation Strategies* to help agricultural producers in those targeted areas implement conservation practices that address the resource concerns. *Long Range Plans* are updated to reflect the changing needs and objectives of the county's natural resources."[34]

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/contact/local/?cid=nrcs142p2_046140

Umatilla County and the Cities Planning Departments

Checking the websites of each of the jurisdictions participating in this *2021 Umatilla County NHMP* provides the following:

- Umatilla County, http://www.co.umatilla.or.us/planning/index.htm
- Adams, http://www.cityofadamsoregon.com/
- Athena, https://www.cityofathena.com/
- Echo, https://echo-oregon.com/
- Helix, this link is on the Umatilla County website, http://www.co.umatilla.or.us/planning/city_info.html#Helix
- Hermiston, https://www.hermiston.or.us/commdev
- Milton-Freewater, https://www.mfcity.com/
- Pilot Rock, https://www.cityofpilotrock.org/
- Pendleton, https://pendleton.or.us/
- Stanfield, https://cityofstanfield.com/
- Ukiah, http://www.cityofukiahoregon.com/
- Umatilla, https://www.umatilla-city.org/
- Weston, http://www.cityofwestonoregon.com/

Emergency Operations Plans

Umatilla County Emergency Management (UCEM) coordinates with NOAA NWS when notices may be required to inform response agencies and the general public of potential emergency events. UCEM response and coordination is outlined in the Umatilla County *Emergency Operations Plan* and usually involves disseminating materials addressing shelter locations, response contact information and other information. Should an emergency event become severe, UCEM is can activate the Emergency Operations Center (EOC) and Joint Information Center (JIC) to coordinate emergency response, evacuation and the dissemination of important public safety information.[35]

The *Umatilla County EOP*, dated January 2012 (ordinance 2012-01 passed 1/18/12), is an all-hazard plan that describes how Umatilla County will organize and respond to emergencies and disasters in

[34] Ibid.

[35] *2014 Umatilla County NHMP*, May 2015

the community. It is based on, and is consistent with Federal, State of Oregon, and other applicable laws, regulations, plans, and policies, including the National Response Framework, and State of Oregon Emergency Operations Plan. The *Umatilla County EOP* is one component of the County's emergency management program and is designed to be compliant with the National Incident Management System.

The *Umatilla County EOP* consists of a Basic Plan, Emergency Support Function Annexes that complement the Federal and State Emergency Support Functions, Support Annexes, and Incident Annexes. It provides a framework for coordinated response and recovery activities during an emergency. It describes how agencies and organizations in Umatilla County will coordinate resources and activities with other Federal, State, local, tribal, and private-sector partners.[36] The Umatilla County EOP includes drought at a hazard.

Umatilla County Emergency Operations Plan, http://www.co.umatilla.or.us/bcc/codes/35.pdf

Umatilla County Critical Groundwater Task Force

Groundwater aquifers underlying Umatilla County have been documented as declining since 1958. Few actions have been implemented to restore the water or decrease the decline. In 2004, the Umatilla County Board of Commissioners chartered the Umatilla County Critical Groundwater Task Force. The Task Force's mission was to "[I]dentify and implement technically and economically feasible measures to enhance and protect groundwater quantity and quality through the year 2050, as an essential natural resource necessary to assure continued economic development in Umatilla County, especially in designated Critical Groundwater Areas.123" The Task Force convened in January, 2004 and met for several years. The Task Force adopted a final plan in 2007, which concluded that groundwater and surface water are interconnected and basin wide concerns will be resolved with the implementation of a basin wide plan. The Task Force established four concepts to assure long term water sustainability. These concepts are included as drought mitigation actions in the *2014 Umatilla County NHMP*.

Umatilla County Watershed Councils

The Umatilla Basin and Walla Walla Basin Watershed Councils were established to promote environmental restoration along the tributaries and main stem Umatilla and Walla Walla Rivers. These councils have completed projects ranging from recharge of alluvial aquifers to riparian planting and federal conservation projects.

Future Changing Conditions/ Climate Change

In the *2021 Umatilla County NHMP*, there are several locations that describe future changing conditions or climate change as it relates to the natural hazards that impact Umatilla County and the cities. In the order of appearance in the NHMP: the Risk Assessment, the Hazards Annexes, and Appendix E contain this information. Within Appendix E there are two documents, the *Future Climate Projections: Umatilla County* and the *Climate Change Two-Page*r.

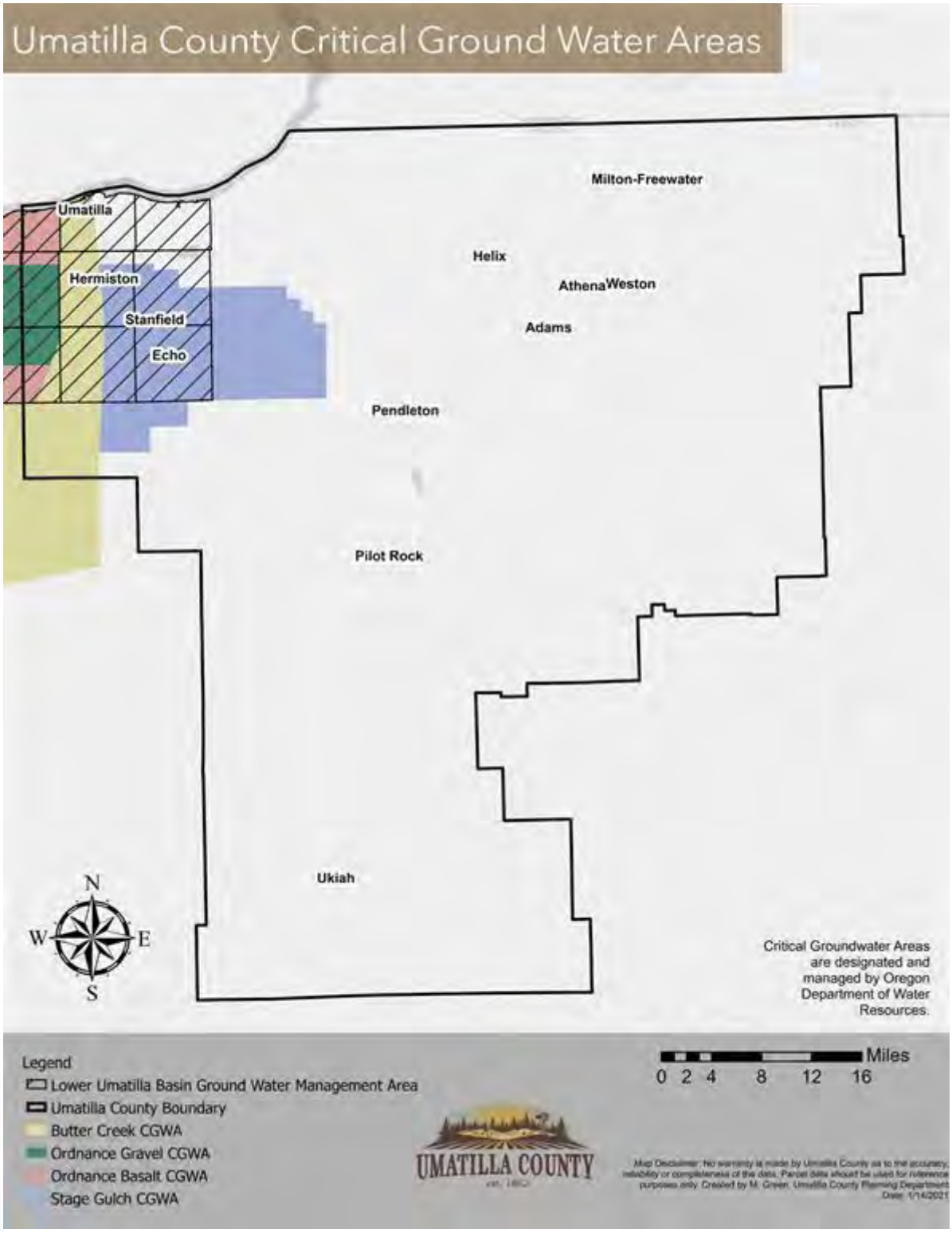
[36] Ecology and Environment, Inc., *Umatilla County Emergency Operations Plan*, January 2012.

Drought Mitigation Actions

The drought mitigation actions have been identified by the Umatilla County NHMP Steering Committee. See Table 3-1, 2021 Umatilla County NHMP Mitigation Actions.

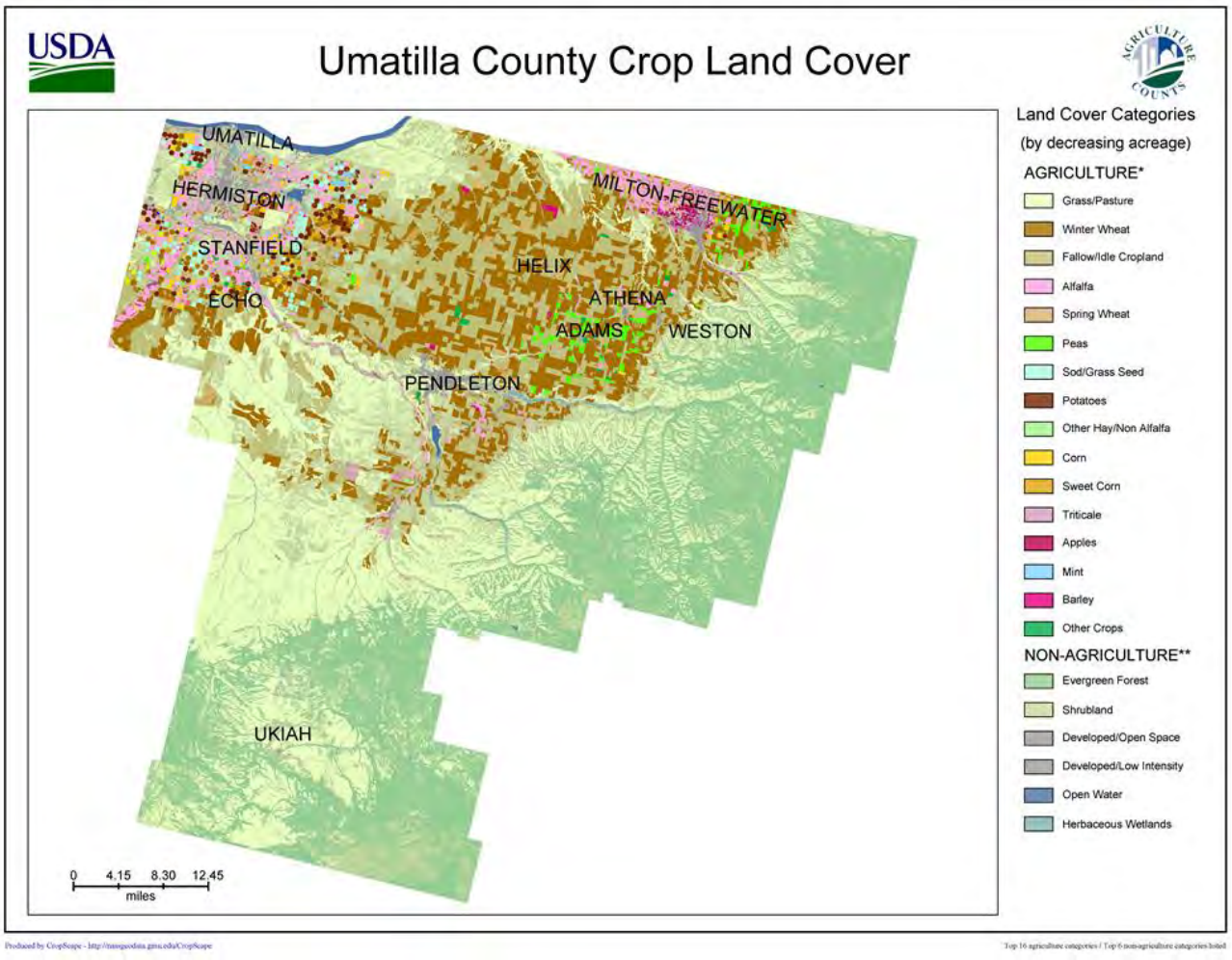
The NHMP Steering Committee agreed to use the HVA risk scores as the priority level for the mitigation actions. There are three drought-specific mitigation actions. The drought-specific mitigation actions have a medium priority because the Hazard Vulnerability Assessment (HVA) resulted in drought having a medium risk level. There are multi-hazard mitigation actions that relate to drought; multi-hazard mitigation actions are high priority. The risk scores and risk level rankings are in Table 2-4 in Section 2 Risk Assessment.

Figure DR-3 Umatilla County Critical Groundwater Areas



Source: Megan Green, Umatilla County, 1/14/21

Figure DR-4 Umatilla County Crop Land Cover



Source: Megan Green, Umatilla County, 1/14/21

Earthquake Hazard Annex

Risk Score: 151

Risk Level: Medium

"An earthquake is a sudden movement of a fault in the earth's crust, abruptly releasing strain that has accumulated over a long period of time. The movement along the fault produces waves of strong shaking that spread in all directions. Two potential damage-causing threats shaking are liquefaction and earthquake-induced landslides. Liquefaction is when saturated soils substantially lose stability due to ground-shaking, causing it to behave like a liquid, which can be a source of tremendous damage. If the earthquake occurs near a populated area, it may cause causalities, economic disruption, and extensive property damage. Oregon is underlain by a large and complex system of faults that can produce damaging earthquakes. Although smaller faults produce smaller earthquakes, they are often close to populated areas and damage can be extensive to nearby buildings."[1]

Causes and Characteristics of Earthquake

Earthquakes occur in Oregon every day; every few years an earthquake is large enough for people to feel; and every few decades there is an earthquake that causes damage. Each year, the Pacific Northwest Seismic Network locates more than 1,000 earthquakes greater than magnitude 1.0 in Washington and Oregon. Of these, approximately two dozen are large enough to feel. These noticeable events offer a subtle reminder that the Pacific Northwest is an earthquake-prone region.

Seismic hazards pose a real and serious threat to many communities in Oregon, including Umatilla County, requiring local governments, planners, and engineers to consider their community's safety. Currently, no reliable scientific means exists to predict earthquakes. Identifying seismic-prone locations, adopting strong policies and implementing measures, and using other mitigation techniques are essential to reducing risk from seismic hazards in Umatilla County.

In the *2014 Umatilla County NHMP*, earthquakes were ranked in fourth place, with five of the nine hazards having no score. In the HVA for the *2021 Umatilla County NHMP*, earthquakes were ranked in seventh place out of nine hazards (removed weather emergencies and added air quality).

Oregon and the Pacific Northwest in general are susceptible to earthquakes from these sources: 1) shallow crustal fault slippage events within the North American Plate; 2) deep intra-plate events within the subducting Juan de Fuca Plate; 3) the off-shore Cascadian Subduction Zone[2]; and 4) earthquakes related to volcanic activity can also affect the region.[3]

[1] DOGAMI, *Natural Hazard Risk Report for Harney County, OR: Including the Cities of Burns, Hines, and the Burns Paiute Reservation and Trust Lands*, May 15, 2018.

[2] OPDR, *Planning for Natural Hazards: Oregon Technical Resource Guide*, July 2001, p. 8-9, https://scholarsbank.uoregon.edu/xmlui/handle/1794/1909

[3] DOGAMI, *Earthquakes in Oregon*, https://www.oregongeology.org/earthquakes/earthquakehome.htm.

Crustal Fault Earthquakes

Crustal fault earthquakes are the most common earthquakes and occur at relatively shallow depths of 6-12 miles below the surface.[4] When crustal faults slip, they can produce earthquakes of magnitudes up to 7.0. Although most crustal fault earthquakes are smaller than 4.0 and generally create little or no damage, some of them can cause extensive damage. Crustal earthquakes occur in the North American plate at relatively shallow depths of 10–20 km (6–12 mi) below the surface. Two sizable crustal earthquakes occurred in 1993 in Oregon: the Scotts Mills earthquake at magnitude 5.6 and the Klamath Falls earthquakes at magnitude 5.9 and 6.0.[5]

Deep Intraplate Earthquakes

Occurring at depths from 18 to 60 miles below the earth's surface in the subducting oceanic crust, deep intraplate earthquakes can reach magnitude 7.5.[6] This type of earthquake is more common in the Puget Sound; in Oregon these earthquakes occur at lower rates and have none have occurred at a damaging magnitude.[7] The February 28, 2001 earthquake in Nisqually, Washington was a deep intraplate earthquake. It produced a rolling motion that was felt from Vancouver, British Columbia to Coos Bay, Oregon and east to Salt Lake City, Utah.[8]

Subduction Zone Earthquakes

The Pacific Northwest is located at a convergent continental plate boundary, where the Juan de Fuca and North American tectonic plates meet. The two plates are converging at a rate of about 1.5 inches per year[9]. This boundary is called the Cascadia Subduction Zone (CSZ). It extends from British Columbia to northern California. See Figure EQ-1 for an illustration. Earthquakes are caused by the abrupt release of this slowly accumulated stress.

Earthquakes Related to Volcanoes

Volcanic eruptions can be triggered by seismic activity or earthquakes can occur during or after a volcanic eruption. Earthquakes produced by stress changes are called volcano-tectonic earthquakes. These earthquakes, typically small to moderate in magnitude, occur as rock is moving to fill in spaces where magma is no longer present and can cause land to subside or produce large ground cracks.[10] In addition to being generated after an eruption and magma withdrawal, these earthquakes also occur as magma is intruding upward into a volcano, opening cracks and pressurizing systems.[11]

[4] Madin, Ian P. and Zhenming Wang, *Relative Earthquake Hazard Maps Report*, DOGAMI, 1999.

[5] DOGAMI, *Earthquakes in Oregon*, https://www.oregongeology.org/earthquakes/earthquakehome.htm.

[6] OPDR, *Planning for Natural Hazards: Oregon Technical Resource Guide*, July 2001, p. 8-8, https://scholarsbank.uoregon.edu/xmlui/handle/1794/1909

[7] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

[8] Hill, Richard, *Geo Watch Warning Quake Shook Portland 40 Years Ago*, The Oregonian. October 30, 2002.

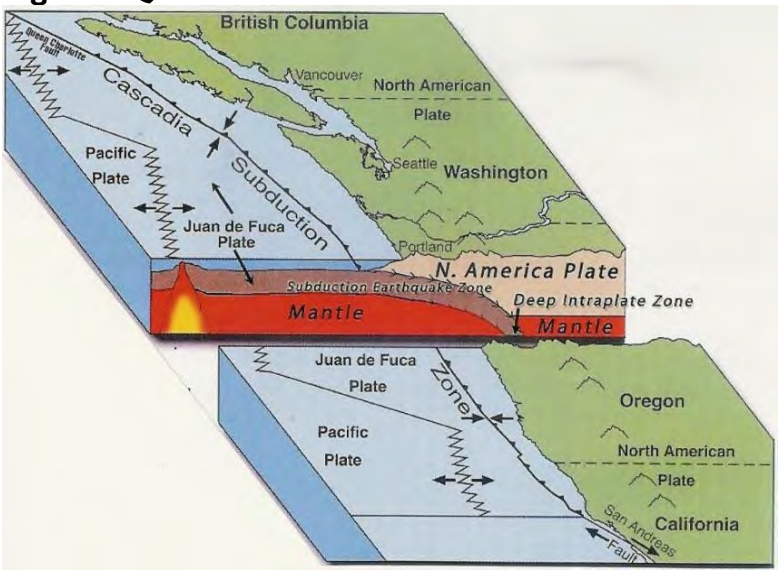
[9] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

[10] Riley, Colleen M., *A Basic Guide to Volcanic Hazards*, Michigan Technological University, http://www.geo.mtu.edu/volcanoes/vc_web/overview/o_health.html.

[11] Scott, W. E., USGS Cascades Volcano Observatory, personal communication, 7/5/01.

Volcano-tectonic earthquakes do not indicate that the volcano will be erupting but can occur at any time and cause damage to manmade structures or provoke landslides.

Figure EQ-1 Active Faults



Source: Cascadia Region Earthquake Workgroup (2005), http://www.oregongeology.org/pubs/ofr/O-05-05.pdf

Although there have been no large recorded earthquakes along the offshore Cascadia Subduction Zone, similar subduction zones worldwide do produce "great" earthquakes with magnitudes of 8 or larger. Historic subduction zone earthquakes include the 1960 Chile earthquake (magnitude 9.5), the 1964 southern Alaska (magnitude 9.2) earthquakes, the 2004 Indian Ocean earthquake (magnitude 9.0) and the 2011 Tohoku earthquake (magnitude 9.0). Returning to closer to home, geologic evidence shows that the Cascadia Subduction Zone has generated great earthquakes, most recently about 300 years ago.[12] Large earthquakes also occur at the southern end of the Cascadia Subduction Zone (in northern California near the Oregon border) where it meets the San Andreas Fault system.

These earthquakes occur because the oceanic crust "sticks" as it is being pushed beneath the continent, rather than sliding smoothly. Over hundreds of years, large stresses build which are released suddenly in great earthquakes. Such earthquakes typically have a minute or more of strong ground shaking, and are quickly followed by numerous large aftershocks.

While all three types of earthquakes have the potential to cause major damage, subduction zone earthquakes pose the greatest danger. A major event could generate an earthquake with a magnitude of 9.0 or greater resulting in devastating damage and loss of life. Such earthquakes may cause great damage to the coastal area of Oregon as well as inland areas in western Oregon. Umatilla County is unlikely to be directly affected by a subduction zone earthquake; however, it

[12] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

could be affected as populations of refugees flee eastward and supplies are staged in the area. It is estimated that shaking from a large subduction zone earthquake could last up to five minutes.[13]

The specific hazards associated with an earthquake are:

- ground shaking,
- ground shaking amplification,
- surface faulting,
- liquefaction and subsidence, and
- earthquake induced landslides and rockfalls.

The specific hazards associated with an earthquake are explained below.

Ground Shaking

Ground shaking is the motion felt on the earth's surface caused by seismic waves generated by the earthquake. Ground shaking is the primary cause of earthquake damage. The strength of ground shaking depends on the magnitude of the earthquake, the type of fault that is slipping, and distance from the epicenter (where the earthquake originates). Buildings on poorly consolidated and thick soils will typically see more damage than buildings on consolidated soils and bedrock. Figure EQ-5 is the Umatilla County Expected Earthquake Shaking map. It is included at the end of the Earthquake Annex.

Ground Shaking Amplification

Ground shaking amplification refers to the soils and soft sedimentary rocks near the surface that can modify ground shaking from an earthquake. Such factors can increase or decrease the amplification (i.e., strength) as well as the frequency of the shaking. The thickness of the geologic materials and their physical properties determine how much amplification will occur. Ground motion amplification increases the risk for buildings and structures built on soft and unconsolidated soils.

> The amount of damage sustained by a building during a strong earthquake is difficult to predict and depends on the size, type and location of the earthquake, the characteristics of the soils at the building site, and the characteristics of the building itself.
>
> DOGAMI, https://www.oregongeology.org/earthquakes/earthquakehome.htm, 7/31/19

Surface Faulting

Surface faulting are planes or surfaces in Earth materials along which failure occurs. Such faults can be found deep within the earth or on the surface. Earthquakes occurring from deep lying faults usually create only ground shaking.

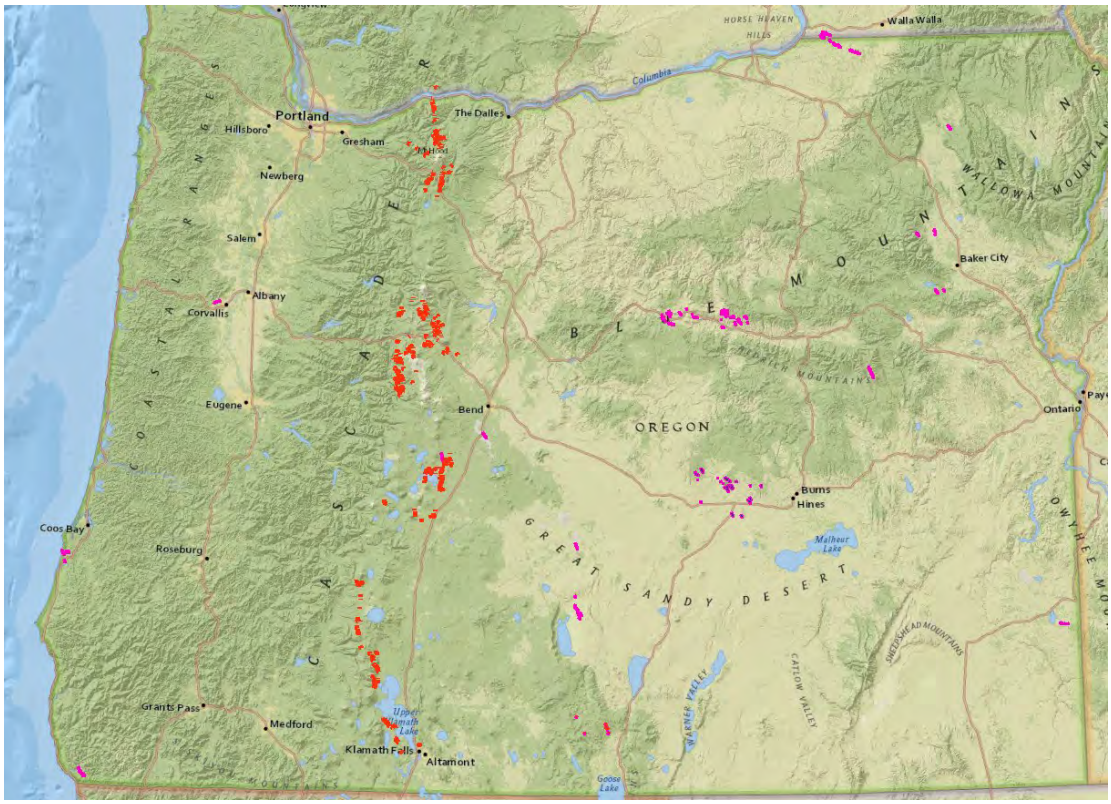
An article published by DOGAMI and others in September 2018 describes a newly discovered fault zone on Mount Hood. The fault zone includes two faults, the Blue Ridge and the Twin Lakes Faults. The discovery of "this active fault system is important for understanding the potential seismic threat for nearby communities." Based on the estimates of the earthquake capability, which are based on

[13] OPDR, *Planning for Natural Hazards: Oregon Technical Resource Guide*, July 2001, p. 8-9, https://scholarsbank.uoregon.edu/xmlui/handle/1794/1909.

observations of average displacement and surface rupture, the fault could produce an earthquake of 6.5 or greater.[14]

While it is distant from major population centers, the fault zone "poses serious seismic threat to the cities of Hood River, Odell, Parkdale, White Salmon, Stevenson, Cascade Locks, Government Camp, and the Villages at Mount Hood" as well as highway and rail transportation corridors in the Columbia Gorge, power generation facilities at Bonneville Dam, storage reservoirs, and the City of Portland's drinking water system in Bull Run. Impacts to these areas would likely have impacts to other parts of Oregon, including Umatilla County.[15] Figure EQ-2 shows the faults in Oregon identified by DOGAMI using Lidar.

Figure EQ-2 Map of Faults in Oregon Identified with Lidar



Source: Ian Madin, DOGAMI, personal communication, October 30, 2018

The numerous faults in Umatilla County are shown in Figure EQ-4 Umatilla County Faults and Fault Lines. The map is included at the end of the Earthquake Annex.

In the *2014 Umatilla County NHMP*, it was noted that there are several known fault lines throughout Umatilla County, and these have further geological analyses ongoing. An earthquake measuring 5.8 occurred in July 1936 and caused damage throughout Umatilla County, especially in the Milton-

[14] Madin, Ian, Ashley Streig, William J. Burns, and Lina Ma, *The Mount Hood Fault Zone – Late Quaternary and Holocene Fault Features Newly mapped with High-Resolution Lidar Imagery*.

[15] Ibid.

Freewater area. This earthquake was associated with the 845c Hite fault system. The *2014 Umatilla County NHMP* further described the fault numbers and names as follows:

568 Columbia Hills Structures,

569 Unnamed fault north of Service Anticline,

710 Ukiah Valley faults,

802a West Grande Ronde Valley fault zone, Mount Emily section,

802b West Grande Ronde Valley fault zone, La Grande section,

803 East Grande Ronde Valley fault zone 845a Hite fault system, Hite section,

845b Hite fault system, Kooskooskie section,

845c Hite fault system, Thorn Hollow section 845d Hite fault system, Agency section, and

846 Wallula fault system.

See Figure EQ-4 for the location of the faults and fault lines in Umatilla County.

Liquefaction and Subsidence

Liquefaction occurs when ground shaking causes wet, granular soils to change from a solid state into a liquid state. This results in the loss of soil strength and the soil's ability to support weight. When the ground can no longer support buildings and structures (subsidence), buildings and their occupants are at risk. Liquefaction susceptibility in Umatilla County is shown on Figure EQ-6 Cascadia Subduction Zone (CSZ) Magnitude 9 Susceptibility. Umatilla County staff obtained the liquefaction susceptibility for the magnitude 9 earthquake from DOGAMI in 2020. The liquefaction susceptibility ranges from none/very low to high in Umatilla County. Figure EQ-6 is the Cascadia Subduction Zone (CSZ) Magnitude 9 Susceptibility map; it is included at the end of the Earthquake Annex.

Earthquake-Induced Landslides and Rockfalls

Earthquake-induced landslides are secondary hazards that occur from ground shaking and can destroy roads, buildings, utilities and critical facilities necessary to recovery efforts after an earthquake. Some Umatilla County communities are built in areas with steep slopes. These areas often have a higher risk of landslides and rockfalls triggered by earthquakes.

Factors for Severity of an Earthquake

The severity of an earthquake is dependent upon a number of factors including: 1) the distance from the earthquake's source (or epicenter); 2) the ability of the soil and rock to conduct the earthquake's seismic energy; 3) the degree (i.e., angle) of slope materials; 4) the composition of slope materials; 5) the magnitude of the earthquake; and 6) the type of earthquake.[16]

[16] Burns, et al, 2007. Unpublished Report. *Geologic Hazards, Earthquakes and Landslide Hazard Maps, and Future Earthquake Damage and Loss Estimates for three Counties in the southeastern Region including Lake, Malheur, and Harney*. DOGAMI Open File Report.

History of Earthquakes in Oregon and Umatilla County

The Pacific Northwest has experienced major earthquakes in 1949 (magnitude 7.1), 1962 (magnitude 5.2), and 2001 (magnitude 6.8). Table EQ-1 shows the date, location, size, and description of selected earthquakes that have occurred in Oregon and Washington.

All of Oregon west of the Cascades is at risk from the four earthquake types and associated hazards. East of the Cascades the earthquake hazard is predominately of the crustal type. No deep intraplate earthquakes have occurred in Oregon at a recordable magnitude. A subduction zone earthquake is anticipated to occur off the Oregon and Washington coasts in the next 50 years, as described below in the "Probability Assessment." The amount of earthquake damage at any place will depend on its distance from the epicenter, local soil conditions, and types of construction. Due to Oregon's relatively short written history and the infrequent occurrence of severe earthquakes, few Oregon earthquakes have been recorded in writing.

The 6.0 earthquake from Klamath Falls in 1993 was not a threat to Umatilla County and is the largest regional earthquake in the last 30 years.

According to the *2014 Umatilla County NHMP*, there have been nearly 100 earthquakes in the Columbia Basin over the last 95 years. Fortunately, most have been minor, but some have been large. The largest recorded earthquake registered 6.1 in the City of Athena in 1936. Almost all of the earthquake epicenters have been in or near population centers and McNary, McKay, and Cold Springs Dams.[17]

A damaging earthquake occurred at 11:08 PM PST on July 15, 1936, near the State line between Milton-Freewater, Oregon, and Walla Walla, Washington. The magnitude 5.75 shock affected an area of about 272,000 square kilometers in Oregon, Washington, and Idaho. Ground cracking was observed about 6.5 kilometers west of Milton-Freewater, and there were marked changes in the flow of well water (VII). Many chimneys were damaged at the roof level in Milton- Freewater; in addition, plaster was broken, and walls cracked. Similar damage was reported from Umapine. Total damage amounted to $100,000. There were numerous aftershocks up to November 17; more than 20 moderate shocks occurred during the night, and stronger ones were felt (V) on July 18 and August 4 and 27.[18]

Table EQ-1 shows selected earthquakes in the Pacific Northwest that have been documented.

Table EQ-1 Significant Historic Earthquakes

Date	Location	Size (M)	Description
Approx: 1400 BCE*, 1050 BCE, 600 BCE, 400. 750, 900	Offshore Cascadia Subduction Zone (CSZ)	Probably 8.0-9.0	Based on studies of earthquake and tsunami at Willapa Bay, Washington. These are the mid-points of the age ranges for these six events.
Jan. 1700	CSZ	About 9.0	On January 26, 1700, an approximately 9.0 earthquake generated a tsunami that struck Oregon, Washington, and Japan. Destroyed Native American

[17] *2014 Umatilla County NHMP*

[18] *2014 Umatilla County NHMP*

Date	Location	Size (M)	Description
			villages along the coast.
Nov. 1873	Brookings, OR	7.3	Impacts: chimneys fell in Port Orford, Grants Pass, and Jacksonville; no aftershocks; origin probably in the Gorda block of the Juan de Fuca plate; intraplate event.
Oct. 1897	Gresham, OR	6.7	Occurred on October 12, 1897.
Feb, 1892	Portland, OR	5.6	Occurred on February 4, 1892.
Mar. 1893	Umatilla, OR	5.7	Occurred on March 7, 1893.
1906	Lakeview, OR	unrecorded	Lakeview area experienced an earthquake.
May 1916	Richland, WA	5.7	Earthquake on May 13, 1916 centered on Richland, WA.
Apr. 1920	Fort Klamath, OR	5.0	Three shocks felt at Fort Klamath; the center was probably in the vicinity of Crater Lake.
1923	Lakeview, OR	unrecorded	Lakeview area experienced an earthquake.
Jul. 1936	Milton-Freewater, OR	6.1	The earthquake occurred on July 16, 1936. There were two foreshocks and many aftershocks felt. Damages were approximately $100,000 (1936 dollars).
Apr. 1949	Olympia, WA	7.1	Significant damage in Washington, including eight deaths. Minor damage in NW Oregon.
Jan. 1951	Hermiston, OR	V on the Modified Mercalli Intensity	Damage unknown.
Dec. 1953	Portland, OR	5.6	Occurred on December 16, 1953.
1958	Adel, OR	4.5	Adel experienced an earthquake with a magnitude 4.5.
Nov. 1962	Vancouver, WA	5.5	Occurred on November 5, 1962. Centered in Vancouver and felt in the metro area, including Portland.
Oct. 1964	Portland, OR	5.3	Occurred on October 1, 1964 on Sauvie Island in the Columbia River
Apr. 1965	Seattle-Tacoma, WA	6.5	3 people killed. Only felt shaking in Multnomah County.
May 1968	Near Lakeview, OR	5.1	A swarm of earthquakes occurred on May 30, 1968 and lasted through July, decreasing in intensity. Earthquake near the Adel-Warner Lakes in south central Oregon. Largest of the tremors was 5.1.
Apr. 1976	Near Maupin, OR	4.8	Sounds described as distant thunder, sonic booms, and strong wind.
Feb. 1981	Mt. St. Helens, WA	5.5	Occurred on February 13, 1981. Centered near Mt. St. Helens and shook the Portland area.
Apr. 1992	Cape Mendocino, CA	7.0	Subduction earthquake at the triple junction of the Cascadia Subduction Zone, San Andreas, and Mendocino faults.
Mar. 1993	Scotts Mills, OR	5.6	DR-985. On Mt. Angel-Gales Creek fault. $30 million damage (including Oregon Capitol Building in Salem). Magnitude 5.6 centered near Woodburn occurred on March 23, 1993.
Sep. 1993	Klamath Falls, OR	6.0	DR-1004. Two earthquakes in Klamath Falls, 2 people killed. Occurred on September 20, 1993. Magnitude 6.0 centered 10 mi NW of Klamath Falls and caused damaged to the courthouse and county offices. Magnitude 5.9 centered 15 mi NW of Klamath Falls closed highways and bridges.
Apr 1999	Christmas Valley	3.9	Christmas Valley experienced a swarm of at least six earthquakes. The highest magnitude earthquake was 3.8.
Feb. 2001	Nisqually, WA	6.8	Felt in the region. No damage reported.
Jun 2004	Lakeview, OR	4.4	Lakeview residents experienced a swarm of at least 20 earthquakes. The source of the earthquakes was SE of Lakeview near the Warner Mountains. The highest magnitude earthquake was 4.4.
May 2007	Lakeview, OR	3.4	Lakeview experienced a small swarm of earthquakes. The highest magnitude earthquake was 3.4.

*BCE: Before the Common Era.
Sources: Wong and Bolt, 1995; 2014 Umatilla County NHMP; DLCD, Oregon NHMP, 2020; FEMA, Disaster Declarations for Oregon, retrieved 2021.

The Pacific Northwest Seismic Network (PNSN) website has a tool to search for recent (https://pnsn.org/earthquakes/recent) and historic earthquakes that have been recorded in the PNSN reporting area. The reporting area for PNSN is shown in an interactive map on the website. DLCD staff performed a search, with the parameter of recorded earthquakes between magnitude

3.0 and 10 that have occurred from January 1, 1960 to December 11, 2019, the results identified 3,282 earthquakes that have occurred. The location, date and time, magnitude, depth, and other information related to each earthquake is provided. The interactive map provides options to vary the search parameters.

Risk Assessment

How are Hazards Identified?

The Oregon Department of Geology and Mineral Industries (DOGAMI), in partnership with other state and federal agencies, has undertaken a rigorous program in Oregon to identify seismic hazards, including active fault identification, bedrock shaking, tsunami inundation zones, ground motion amplification, liquefaction, and earthquake induced landslides. DOGAMI has published a number of seismic hazard maps that are available for Oregon communities to use. The maps show liquefaction, ground motion amplification, landslide susceptibility, and relative earthquake hazards.

Umatilla County used the DOGAMI Statewide Geohazards Viewer to create maps of:

- Figure EQ-3 Umatilla County Earthquake Hazard: Earthquake History
- Figure EQ-4 Umatilla County Earthquake Hazard: Faults and Fault Lines
- Figure EQ-5 Umatilla County Earthquake Hazard: Expected Shaking, and
- Figure EQ-6 Umatilla County Earthquake Hazard: Cascadia Subduction Zone (CSZ) Magnitude 9 Susceptibility.

The extent of the damage to structures and injury and death to people will depend upon the type of earthquake, proximity to the epicenter and the magnitude and duration of the event.

Hazard Risk Analysis

The Umatilla County NHMP Steering Committee completed a Hazard Vulnerability Assessment/Analysis (HVA) during this NHMP update. This was described in Section 2 Risk Assessment. The method used for the HVA was developed from a Federal Emergency Management Agency (FEMA) tool that has been refined by the Oregon Office of Emergency Management (OEM). It addresses and weights (shown as percent within parentheses) probability (29%), vulnerability (21%), maximum threat (42%) and the history (8%) of each natural hazard and attributes a final hazard analysis score. The methodology produces scores that range from 24 to 240.

For local governments, conducting the HVA is a useful step in planning for hazard mitigation. The method provides the jurisdiction with a relative ranking from which to prioritize mitigation actions, but does not predict the occurrence of a particular hazard.

In the *2014 Umatilla County NHMP*, earthquakes were ranked in fourth place, with five of the nine hazards having no score. In the HVA for the *2021 Umatilla County NHMP*, earthquakes were ranked in seventh place out of nine hazards (removed weather emergencies and added air quality).

For more information on all the risk scores and ranks of the natural hazards, see Volume I Basic Plan, Section 2 Risk Assessment of this NHMP.

Probability Assessment

Paleoseismic studies along the Oregon coast indicate that the state has experienced seven Cascadia Subduction Zone (CSZ) events possibly as large as M9 in the last 3,500 years. These events are estimated to have an average recurrence interval between 500 and 600 years, although the time interval between individual events ranges from 150 to 1,000 years. The last CSZ event occurred approximately 300 years ago. Scientists estimate the chance in the next 50 years of a great subduction zone earthquake is between 10 and 20 percent, assuming that the recurrence is on the order of 400 +/- 200 years.[19]

It is simply not scientifically feasible to predict, or even estimate, when the next CSZ earthquake will occur, but research efforts show the calculated odds that a CSZ earthquake will occur in the next 50 years range from 7-15 percent for a great earthquake affecting the entire Pacific Northwest to about 37 percent for a very large earthquake affecting southern Oregon and northern California. The likelihood of a M9 CSZ earthquake and the consequences of such an earthquake are both so great that it is prudent to consider the CSZ earthquake when designing new structures or retrofit of existing structures, evaluating the seismic safety of existing structures, or planning emergency response and preparedness.[20]

New research from Oregon State University suggests that the CSZ has at least four segments that sometimes rupture independently of one another. Magnitude-9 ruptures affecting the entire subduction zone have occurred 19 times in the past 10,000 years. Over that time, shorter segments have ruptured farther south in Oregon and Northern California, producing magnitude-8 quakes. As such, the risks of a subduction zone earthquake may differ from north to south. Earthquakes originating in the northern portion of the CSZ tend to rupture the full length of the subduction zone. In southern Oregon and Northern California, quakes along the subduction zone appear to strike more frequently.[21]

In August 2016, new analysis about CSZ earthquakes, from Oregon State University (OSU), was published. The analysis suggests that CSZ earthquakes affecting more heavily populated areas are slightly more frequent than previously thought. These findings show the chances of an earthquake in the next 50 years have increased. "For central and northern Oregon, the chance of a seismic event during that period has been changed to 15-20 percent instead of 14-17 percent. In the zone area within Washington and British Columbia, the chance of an event has increased to 10-17 percent from 8-14 percent."[22]

According to Chris Goldfinger of OSU, "These new results are based on much better data than has been available before, and reinforce our confidence in findings regarding the potential for major earthquakes on the Cascadia Subduction Zone, especially the northern parts. The frequency,

[19] DOGAMI, *Oregon Geology*, Volume 64, No. 1, Spring 2002, https://www.oregongeology.org/pubs/og/p-OG.htm

[20] Oregon Seismic Safety Policy Advisory Commission (OSSPAC), *The Oregon Resilience Plan: Reducing Risk and Improving Recovery for the Next Cascadia Earthquake and Tsunami, Report to the 77th Legislative Assembly*, February 2013, https://www.oregon.gov/oem/documents/oregon_resilience_plan_final.pdf

[21] Rojas-Burke, Joe, *Predicting the next Northwest mega-quake still a struggle for geologists*, The Oregonian. April 20, 2010.

[22] Meny, E. (2016, August 5). *Subduction zone earthquakes more frequent than originally thought, OSU finds*. KVAL-TV. Retrieved from http://kval.com/news/local/osu-researchers-find-subduction-zone-earthquakes-more-frequent-than-originally-thought

although not the intensity, of earthquakes there appears to be somewhat higher than we previously estimated."[23]

Establishing a probability for crustal earthquakes is more difficult. Oregon's seismic record is short and the number of earthquakes above a magnitude 4 centered in the southeastern Oregon region is small. Therefore, with such limited data, any kind of prediction would be questionable. Earthquakes generated by volcanic activity in Oregon's Cascade Range are possible, but likewise unpredictable.

Vulnerability Assessment

The effects of earthquakes span a large area. The degree to which earthquakes are felt, however, and the damages associated with them may vary. At risk from earthquake damage are unreinforced masonry buildings, bridges built before earthquake standards were incorporated into building codes, sewer, water, and natural gas pipelines, petroleum pipelines, and other critical facilities and private property located within the County.

Earthquake damage to roads and bridges can be particularly serious by hampering or cutting off the movement of people and goods and disrupting the provision of emergency response services. Such effects in turn can produce serious impacts on the local and regional economy by disconnecting people from work, home, food, school and needed commercial, medical and social services. A major earthquake can separate businesses and other employers from their employees, customers, and suppliers thereby further hurting the economy. Should an earthquake damage transportation routes, communities in Umatilla County can find themselves isolated. Following an earthquake event, the cleanup of debris can be a huge challenge for the community.

Building Collapse Potential

In 2007, DOGAMI completed a rapid visual screening (RVS) of educational and emergency facilities in communities across Oregon, as directed by the Oregon Legislature in Senate Bill 2 (2005). RVS is a technique used by the Federal Emergency Management Agency (FEMA), known as FEMA 154, to identify, inventory, and rank buildings that are potentially vulnerable to seismic events.

The following tables display the results from assessments made in Umatilla County for public schools, Blue Mountain Community College and some fire department buildings. This information was also included in the *2014 Umatilla County NHMP*.

DOGAMI scored each building with a 'low,' 'moderate,' 'high,' or 'very high' potential of collapse in the event of an earthquake. It is important to note that these rankings represent a probability of collapse based on limited observed and analytical data and are therefore approximate rankings.[24] To fully assess a building's potential of collapse, a more detailed engineering study completed by a qualified professional is required, but the RVS study can help to prioritize which buildings to retrofit.

[23] Ibid.

[24] State of Oregon Department of Geologic and Mineral Industries, *Implementation of 2005 Senate Bill 2 Relating to Public Safety, Seismic Safety and Seismic Rehabilitation of Public Building,* May 22, 2007, Open File Report 0-07-02.

Table EQ-2: DOGAMI Building Collapse Potential Scores from 2007 Study

District	Facility Name	Collapse Potential
Hermiston	Highland Hills Elementary School	2.6 Low (<1%)
	Highland Hills Elementary School	2.6 Low (<1%)
	Highland Hills Elementary School	0.3 High (>10%)
	Rocky Heights Elementary School	(0.1) Very High (100%)
	Rocky Heights Elementary School	(0.1) Very High (100%)
	Sandstone Middle School	Low (<1%)
	Sunset Elementary School	0.3 High (>10%)
	Sunset Elementary School	2.6 Low (<1%)
	Sunset Elementary School	2.6 Low (<1%)
	Sunset Elementary School	2.6 Low (<1%)
	West Park Elementary School	(0.1) Very High (100%)
	West Park Elementary School	2.4 Low (<1%)
	West Park Elementary School	2.4 Low (<1%)
	West Park Elementary School	1.7 Moderate (>1%)
	Armand Larive Middle School	(0.1) Very High (100%)
	Armand Larive Middle School	(0.1) Very High (100%)
	Armand Larive Middle School	0.3 High (>10%)
	Armand Larive Middle School	0.3 High (>10%)
	Armand Larive Middle School	0.3 High (>10%)
	Desert View Elementary School	Low (<1%)
Pendleton	Lincoln Primary School	0.7 High (>10%)
	Lincoln Primary School	1.8 Moderate (>1%)
	Lincoln Primary School	5.9 Low (<1%)
	McKay Creek Elementary School	0.5 High (>10%)
	McKay Creek Elementary School	2.1 Low (<1%)
	Pendleton High School	0.3 High (>10%)
	Pendleton High School	(0.1) Very High (100%)
	Pendleton High School	0.8 High (>10%)
	Pendleton High School	0.3 High (>10%)
	Pendleton High School	0.3 High (>10%)
	Sherwood Heights Elementary School	1.1 Moderate (>1%)
	Sherwood Heights Elementary School	1.1 Moderate (>1%)
	Sherwood Heights Elementary School	1.1 Moderate (>1%)
	Sherwood Heights Elementary School	1.1 Moderate (>1%)
	Sherwood Heights Elementary School	2.9 Low (<1%)
	Sunridge Middle School	1.1 Moderate (>1%)
	Washington Elementary School	(0.9) Very High (100%)
	Washington Elementary School	5.0 Low (<1%)
	Washington Elementary School	0.3 High (>10%)
	West Hills Intermediate	0.3 High (>10%)
	West Hills Intermediate	2.8 Low (<1%)
Umatilla	Clara Brownell Middle School	0.3 High (>10%)
	Clara Brownell Middle School	0.3 High (>10%)
	McNary Heights Elementary School	(0.1) Very High (100%)
	Umatilla High School Moderate	Low (<1%)

Stanfield	Stanfield Elementary School	Low (<1%)
	Stanfield Secondary School	2.7 Low (<1%)
Pilot Rock	Pilot Rock Elementary School	3.1 Low (<1%)
	Pilot Rock Elementary School	3.6 Low (<1%)
	Pilot Rock Elementary School	1.1 Moderate (>1%)
	Pilot Rock Elementary School	1.1 Moderate (>1%)
	Pilot Rock High School	1.0 High (>10%)
	Pilot Rock High School	0.5 High (>10%)
	Pilot Rock High School	1.1 Moderate (>1%)
	Pilot Rock High School	1.1 Moderate (>1%)
	Pilot Rock High School	1.1 Moderate (>1%)
Milton Freewater	Central Middle School	1.7 Moderate (>1%)
	Central Middle School	(0.1) Very High (100%)
	Central Middle School	1.9 Moderate (>1%)
	Central Middle School	(0.1) Very High (100%)
	Ferndale Elementary School	(0.1) Very High (100%)
	Ferndale Elementary School	0.3 High (>10%)
	Ferndale Elementary School	0.3 High (>10%)
	Freewater Elementary School	0.2 High (>10%)
	Freewater Elementary School	(0.5) Very High (100%)
	Freewater Elementary School	0.4 High (>10%)
	Grove Elementary School	0.6 High (>10%)
	Grove Elementary School	0.3 High (>10%)
	Grove Elementary School	0.3 High (>10%)
	McLoughlin High School	0.2 High (>10%)
	McLoughlin High School	0.0 Very High (100%)
	McLoughlin High School	0.0 Very High (100%)
	McLoughlin High School	2.0 Moderate (>1%)
	McLoughlin High School	Very High (100%)
	McLoughlin High School	Moderate (>1%)
Helix	Helix School	High (>10%)
	Helix School	High (>10%)
	Helix School	Low (<1%)
	Helix School	High (>10%)
Echo	Echo School	High (>10%)
	Echo School	High (>10%)
	Echo School	High (>10%)
	Echo School	High (>10%)
	Echo School	Low (<1%)

Source: DOGAMI 2007. Open File Report 0-07-02. Statewide Seismic Needs Assessment Using Rapid Visual Assessment. http://www.oregongeology.org/sub/projects/rvs/OFR-O-07-02-SNAA-onscreen.pdf

There are Seismic Rehabilitation Grants available through the State of Oregon's competitive Seismic Rehabilitation Grant Program (SRGP; see below for more information). See end of this annex and Appendix D for more information.

Community Earthquake Issues

Earthquake damage occurs because humans have built structures that cannot withstand severe shaking. Buildings, airports, schools, and lifelines (highways, phone lines, gas, water, etc.) suffer damage in earthquakes and can ultimately result in death or injury to humans.

Death and Injury

Death and injury can occur both inside and outside of buildings due to falling equipment, furniture, debris, and structural materials. Likewise, downed power lines or broken water and gas lines endanger human life. Death and injury are highest in the afternoon when damage occurs to commercial and residential buildings and during the evening hours in residential settings.[25]

Building and Home Damage

Wood structures tend to withstand earthquakes better than structures made of brick or unreinforced masonry buildings.[26] Building construction and design play a vital role in the survival of a structure during earthquakes. Damage can be quite severe if structures are not designed with seismic reinforcements or if structures are located atop soils that liquefy or amplify shaking. Whole buildings can collapse or be displaced.

Bridge Damage

All bridges can sustain damage during earthquakes, leaving them unsafe for use. More rarely, some bridges have failed completely due to strong ground motion. Bridges are a vital transportation link – damage to them can make some areas inaccessible.

Because bridges vary in size, materials, siting, and design, earthquakes will affect each bridge differently. Bridges built before the mid 1970's often do not have proper seismic reinforcements. These bridges have a significantly higher risk of suffering structural damage during a moderate to large earthquake. Bridges built in the 1980's and after are more likely to have the structural components necessary to withstand a large earthquake.[27]

Damage to Lifelines

Lifelines are the connections between communities and critical services such as water and gas lines, transportation systems, electricity, and communication networks. Ground shaking and amplification can cause pipes to break open, power lines to fall, roads and railways to crack or move, and radio or telephone communication to cease. Disruption to transportation makes it especially difficult to bring in supplies or services. Functioning lifelines allow for rescue, recovery, and rebuilding efforts and to relay important information to the public. In the *2021 Umatilla County NHMP*, Section 2 Risk

[25] OPDR, *Planning for Natural Hazards: Oregon Technical Resource Guide*, July 2001, p. 8-9, https://scholarsbank.uoregon.edu/xmlui/handle/1794/1909.

[26] Wolfe, Myer, et al. *Land Use Planning for Earthquake Hazard Mitigation: A Handbook for Planners*, Special Publication 14, Natural Hazards Research and Applications Information Center, https://scholarcommons.usf.edu/fmhi_pub/82/.

[27] University of Washington, www.geophys.washington.edu/SEIS/PNSN/INFO_GENERAL/faq.html#3, the legacy domains of geology.washington.edu and geophys.washington.edu are no longer fully functional; rather they will now simply redirect you to this page, accessed 7/12/19.

Assessment includes this information specific to Umatilla County, the Cities, and the Special Districts; see Table 2-7, Critical /Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers.

Disruption of Critical Facilities, Infrastructure, and Lifelines

Critical facilities sometimes referred to as essential facilities, are police stations, fire stations, hospitals, and shelters. These are facilities that provide services to the community and need to be functional after an earthquake event. The earthquake effects outlined above can cause emergency response to be disrupted.[28] Section 2 Risk Assessment includes Table 2-7, Critical Facilities, Critical Infrastructure, and Lifelines and more details on them.

Economic Loss: Equipment and Inventory Damage, Lost Income

Seismic activity can cause great loss to businesses, either a large-scale corporation or a small retail shop. Losses not only result in rebuilding cost, but fragile inventory and equipment can be destroyed. When a company is forced to stop production for just a day, business loss can be tremendous. Residents, businesses, and industry all suffer temporary loss of income when their source of finances are damaged or disrupted.

Fire

Downed power lines or broken gas mains can trigger fires. When fire stations suffer building or lifeline damage, quick response to quench fires is less likely.

Debris

After damage occurs to a variety of structures, access may be limited in many places. It will take time to clean up brick, glass, wood, steel or concrete building elements, office and home contents, and other materials.

Disruption of Critical Facilities

Critical facilities are police stations, fire stations, hospitals, and shelters. These are facilities that provide services to the community and need to be functional after an earthquake event. The earthquake effects outlined above can all cause emergency response to be disrupted after a significant event.[29] More information about Umatilla County's critical infrastructure can be found in Section 2 Risk Assessment and in Appendix I.

Economic Loss: Equipment and Inventory Damage, Lost Income

Seismic activity can cause great loss to businesses, either a large-scale corporation or a small retail shop. Losses not only result in rebuilding cost, but fragile inventory and equipment can be

[28] DOGAMI, Yumei Wang and J.L. Clark, *Earthquake Damage in Oregon: Preliminary Estimates of Future Earthquake Losses*, https://www.oregongeology.org/pubs/sp/SP-29.pdf.

[29] DOGAMI, Yumei Wang and J.L. Clark, *Earthquake Damage in Oregon: Preliminary Estimates of Future Earthquake Losses*, https://www.oregongeology.org/pubs/sp/SP-29.pdf

destroyed. When a company is forced to stop production for just a day, business loss can be tremendous. Residents, businesses, and industry all suffer temporary loss of income when their source of finances are damaged or disrupted.

Fire

Downed power lines or broken gas mains can trigger fires. When fire stations suffer building or lifeline damage, quick response to quench fires is less likely.

Debris

After damage occurs to a variety of structures, much time is spent cleaning up brick, glass, wood, steel or concrete building elements, office and home contents, and other materials.

Existing Hazard Mitigation Activities and Resources

Mitigation through either regulatory or non-regulatory, voluntary strategies allow communities to gain cooperation, educate the public, and provide solutions to increase safety in the event of an earthquake.[30]

Ordinances

Checking the websites of each of the jurisdictions participating in this *2021 Umatilla County NHMP* provides the following:

- Umatilla County, http://www.co.umatilla.or.us/planning/index.htm
- Adams, http://www.cityofadamsoregon.com/
- Athena, https://www.cityofathena.com/
- Echo, https://echo-oregon.com/
- Helix, this link is on the Umatilla County website, http://www.co.umatilla.or.us/planning/city_info.html#Helix
- Hermiston, https://www.hermiston.or.us/commdev
- Milton-Freewater, https://www.mfcity.com/
- Pilot Rock, https://www.cityofpilotrock.org/
- Pendleton, https://pendleton.or.us/
- Stanfield, https://cityofstanfield.com/
- Ukiah, http://www.cityofukiahoregon.com/
- Umatilla, https://www.umatilla-city.org/
- Weston, http://www.cityofwestonoregon.com/

Studies/Reports

The USGS *Open File Report for Quaternary Faults and Folds in Oregon* contains a map that shows faults and folds in the state of Oregon that exhibit evidence of Quaternary deformation, and includes data on timing of most recent movement, sense of movement, slip rate, and continuity of surface expression. The primary purpose of this compilation is for use in earthquake-hazard

[30] OPDR, *Planning for Natural Hazards: Oregon Technical Resource Guide*, July 20001, p. 8-20. https://scholarsbank.uoregon.edu/xmlui/handle/1794/1909

evaluations. Paleoseismic studies, which evaluate the history of surface faulting or deformation along structures with evidence of Quaternary movement, provide a long-term perspective that augments the short historic records of seismicity in many regions. Published or publicly available data are the primary sources of data used to compile this report.
https://pubs.usgs.gov/of/2003/ofr-03-095/

Oregon Senate Bill 2, Statewide Seismic Needs Assessment Using Rapid Visual Screening (RVS) (2005) directed DOGAMI, in consultation with project partners, to develop a statewide seismic needs assessment that included seismic safety surveys of K-12 public school buildings and community college buildings that had, at the time, a capacity of 250 or more persons, hospital buildings with acute inpatient care facilities, fire stations, police stations, sheriffs' offices and other law enforcement agency buildings.
https://www.oregonlegislature.gov/bills_laws/lawsstatutes/2005orLaw0763ses.html.

In 2007, DOGAMI released the Statewide Seismic Needs Assessment Using Rapid Visual Screening (RVS), which contains a preliminary assessment of the seismic resilience of critical infrastructure in each county in Oregon. Table EQ-2, DOGAMI Building Collapse Potential Scores from 2007 Study, shows the results of the assessment for Umatilla County. For more information on the Statewide Seismic Assessment Using Rapid Visual Screenings, see
https://www.oregongeology.org/rvs/default.htm.

State Natural Hazard Risk Assessment

The risk assessment in the *2020 Oregon Natural Hazards Mitigation Plan* provides an overview of seismic risk in Oregon and identifies the most significant earthquakes in Oregon's recorded history. It has overall state and regional information, and includes earthquake related mitigation actions for the entire state.
https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_05b_RAState.pdf

Published in 2013, *The Oregon Resilience Plan: Reducing Risk and Improving Recovery for the Next Cascadia Earthquake and Tsunami* provides excellent information on the seismic situation in Oregon. https://www.oregon.gov/oem/documents/oregon_resilience_plan_final.pdf

Planning for Natural Hazards: Oregon Technical Resource Guide

This guide describes basic mitigation strategies and resources related to earthquakes and other natural hazards, including examples from communities in Oregon.
https://scholarsbank.uoregon.edu/xmlui/handle/1794/1909

Individual Preparedness

At an individual level, preparedness for an earthquake is minimal as perception and awareness of earthquake hazards are low. Strapping down heavy furniture, water heaters and expensive personal property as well as having earthquake insurance, is a step towards earthquake mitigation. The *2020 Umatilla County NHMP* includes Table 3-1, 2020 Umatilla County Mitigation Actions. There are earthquake-specific mitigation actions in addition to the multi-hazard mitigation actions which includes all hazards. See also the Earthquake Mitigation Actions section below.

Earthquake Awareness Month

April is Earthquake Awareness Month. Oregon Office of Emergency Management coordinates activities such as earthquake drills and encourages individuals to strap down computers, heavy furniture and bookshelves in homes and offices.

School Education

Schools conduct earthquake drills regularly throughout Oregon and teach students how to respond when an earthquake event occurs.

Building Codes

The Oregon State Building Codes Division adopts statewide standards for building construction that are administered by the state, cities and counties throughout Oregon. The codes apply to new construction and to the alteration of, or addition to, existing structures. Within these standards are six levels of design and engineering specifications that are applied to areas according to the expected degree of ground motion and site conditions that a given area could experience during an earthquake.

The *2019 Oregon Structural Special Code* (*OSSC*) requires a site-specific seismic hazard report for projects including critical/essential facilities such as hospitals, fire and police stations, emergency response facilities, and special occupancy structures, such as large schools and prisons. See https://codes.iccsafe.org/content/OSSC2019P1.

The seismic hazard report required by *OSSC* for critical/essential facilities and special occupancy structures considers factors such as the seismic zone, soil characteristics including amplification and liquefaction potential, any known faults, and potential landslides. The findings of the seismic hazard report must be considered in the design of the building.

The *2017 Oregon Residential Special Code* (*ORSC*) incorporates prescriptive requirements for foundation reinforcement and framing connections based on the applicable seismic zone for the area. The cost of these requirements is rarely more than a small percentage of the overall cost for a new building. See https://codes.iccsafe.org/content/document/1018?site_type=public.

Requirements for existing buildings vary depending on the type and size of the alteration and whether there is a change in the use of the building that is considered more hazardous. Oregon State Building Codes recognize the difficulty of meeting new construction standards in existing buildings and allow some exception to the general seismic standards. Upgrading existing buildings to resist earthquake forces can be more expensive than meeting code requirements for new construction. The state code only requires seismic upgrades when there is significant structural alteration to the building or where there is a change in use that puts building occupants and the community at greater risk.

Local building officials are responsible for enforcing these codes. Although there is no statewide building code for substandard structures, local communities have the option of adopting a local building code to mitigate hazards in existing buildings. Oregon Revised Statutes allow municipalities to create local programs to require seismic retrofitting of existing buildings within their communities. The building codes do not regulate public utilities or facilities constructed in public right-of-way, such as bridges.

Emergency Operations Plans

Umatilla County Emergency Management (UCEM) coordinates with NOAA NWS when notices may be required to inform response agencies and the general public of potential emergency events. UCEM response and coordination is outlined in the Umatilla County *Emergency Operations Plan* and usually involves disseminating materials addressing shelter locations, response contact information and other information. Should an emergency event become severe, UCEM is can activate the Emergency Operations Center (EOC) and Joint Information Center (JIC) to coordinate emergency response, evacuation and the dissemination of important public safety information.[31]

The *Umatilla County EOP*, dated January 2012 (ordinance 2012-01 passed 1/18/12), is an all-hazard plan that describes how Umatilla County will organize and respond to emergencies and disasters in the community. It is based on, and is consistent with Federal, State of Oregon, and other applicable laws, regulations, plans, and policies, including the National Response Framework, and State of Oregon Emergency Operations Plan. The *Umatilla County EOP* is one component of the County's emergency management program and is designed to be compliant with the National Incident Management System.

The *Umatilla County EOP* consists of a Basic Plan, Emergency Support Function Annexes that complement the Federal and State Emergency Support Functions, Support Annexes, and Incident Annexes. It provides a framework for coordinated response and recovery activities during an emergency. It describes how agencies and organizations in Umatilla County will coordinate resources and activities with other Federal, State, local, tribal, and private-sector partners.[32] The *Umatilla County EOP* includes earthquakes as a hazard.

Umatilla County Emergency Operations Plan, http://www.co.umatilla.or.us/bcc/codes/35.pdf

Future Changing Conditions/ Climate Change

In the *2021 Umatilla County NHMP*, there are several locations that describe future changing conditions or climate change as it relates to the natural hazards that impact Umatilla County and the cities. In the order of appearance in the NHMP: the Risk Assessment, the Hazards Annexes, and Appendix E contain this information. Within Appendix E there are two documents, the *Future Climate Projections: Umatilla County* and the *Climate Change Two-Page*r.

Earthquake Mitigation Actions

There are multi-hazard mitigation actions that include all hazards and earthquake-specific mitigation actions; all have been identified by the Umatilla County NHMP Steering Committee. See Table 3-1, 2020 Umatilla County Mitigation Actions.

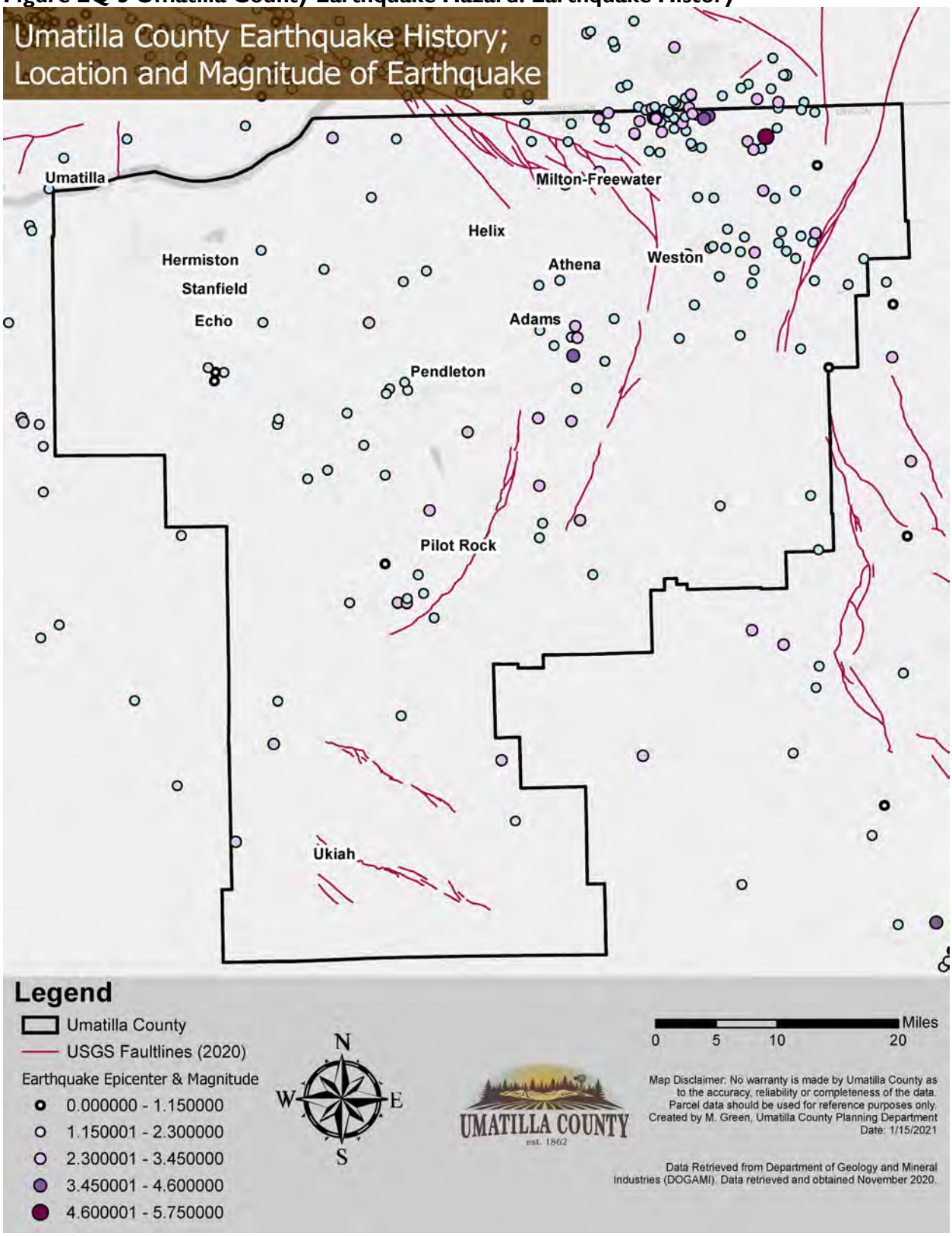
[31] *2014 Umatilla County NHMP*, May 2015

[32] Ecology and Environment, Inc., *Umatilla County Emergency Operations Plan*, January 2012.

The NHMP Steering Committee agreed to use the HVA risk scores as the priority level for the mitigation actions. There are two earthquake-specific mitigation actions. The earthquake specific mitigation actions have a medium priority because the Hazard Vulnerability Assessment (HVA) resulted in earthquakes having a medium risk level. There are multi-hazard mitigation actions that relate to earthquakes; multi-hazard mitigation actions are high priority.

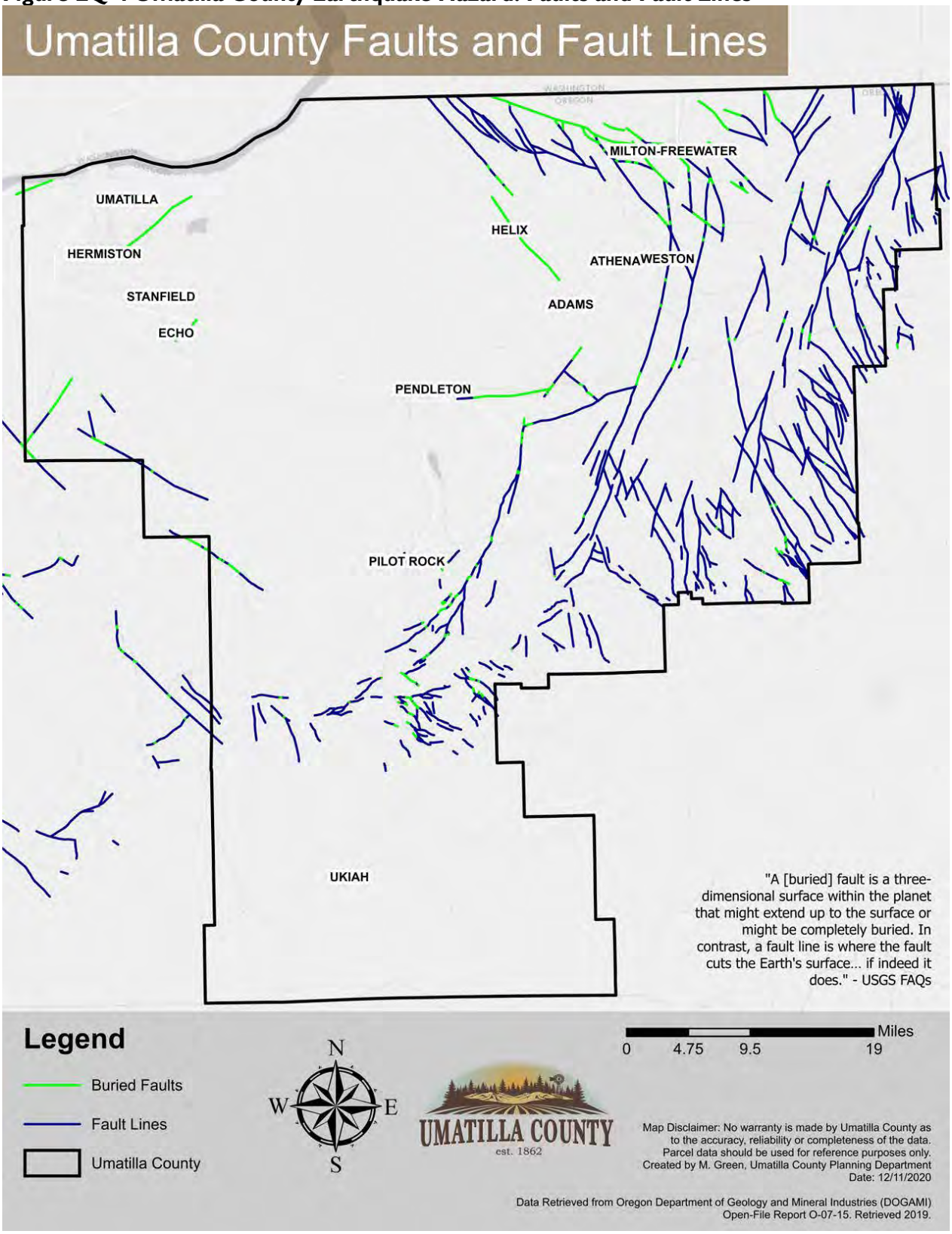
The HVA, risk scores, and risk levels are also described in Section 2 Risk Assessment. The Critical Infrastructure List is included in Section 2 Risk Assessment.

Figure EQ-3 Umatilla County Earthquake Hazard: Earthquake History



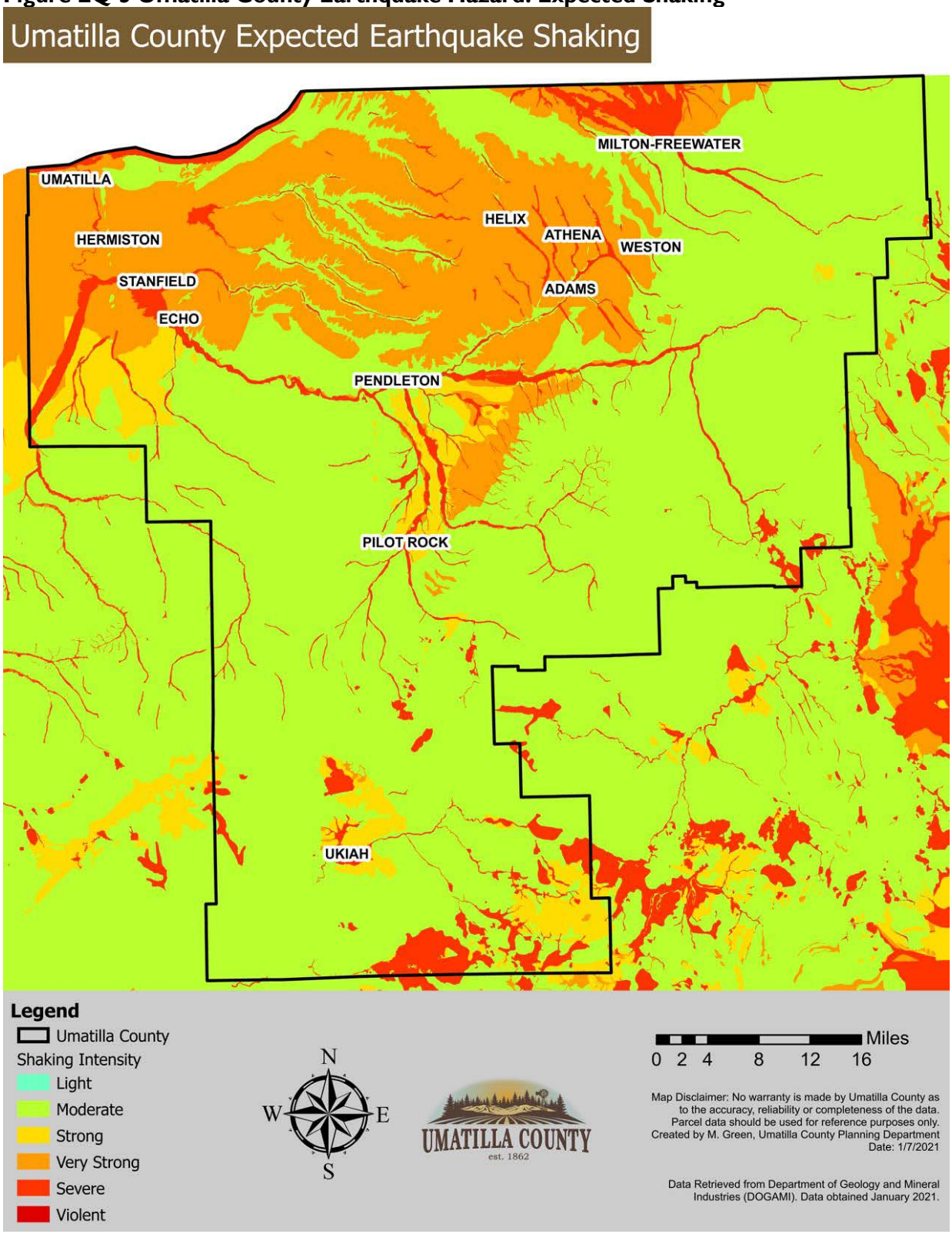
Source: Megan Green, Umatilla County, 1/15/21

Figure EQ-4 Umatilla County Earthquake Hazard: Faults and Fault Lines



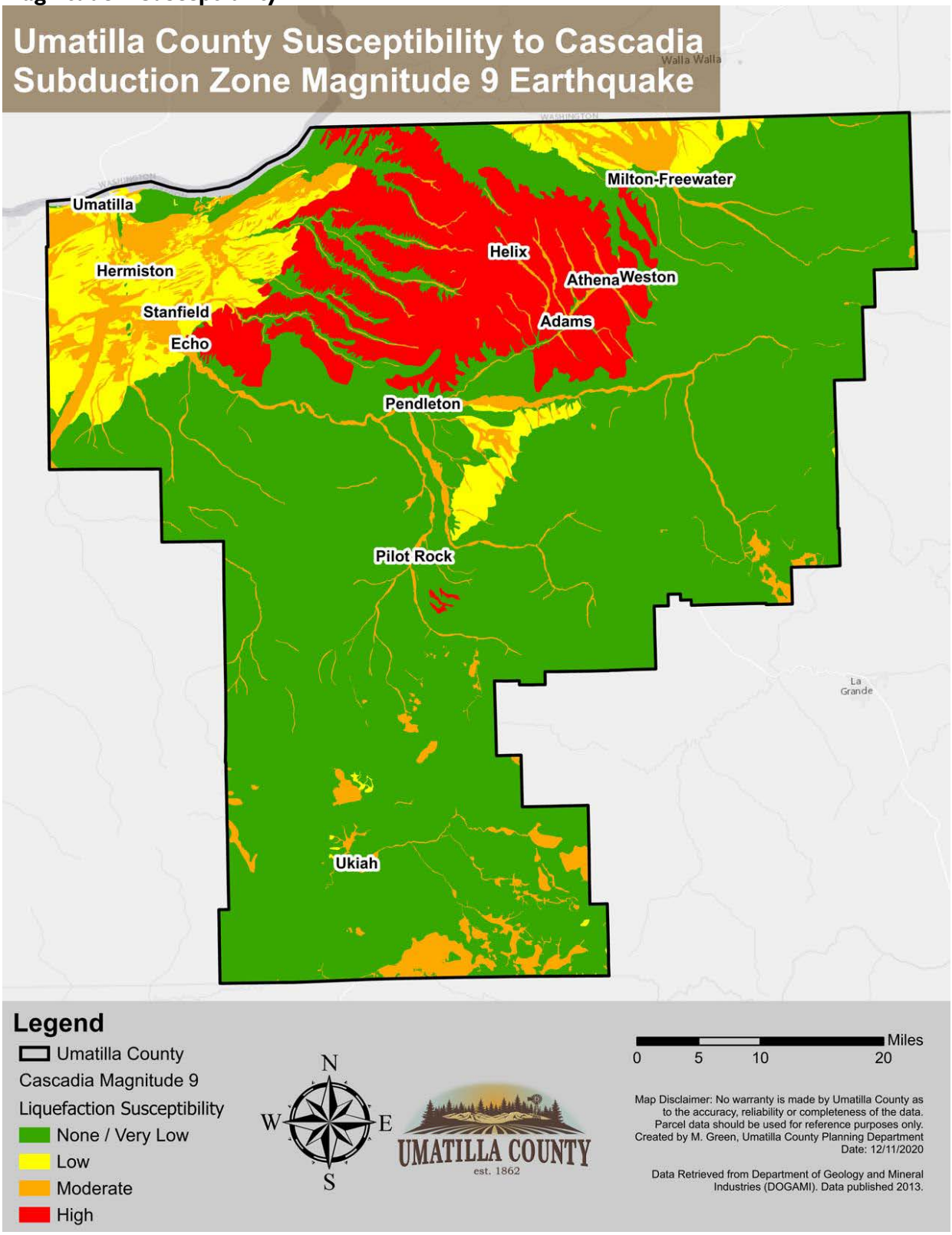
Source: Megan Green, Umatilla County, 12/11/20

Figure EQ-5 Umatilla County Earthquake Hazard: Expected Shaking



Source: Megan Green, Umatilla County, 1/7/21

Figure EQ-6 Umatilla County Earthquake Hazard: Cascadia Subduction Zone (CSZ) Magnitude 9 Susceptibility



Source: Megan Green, Umatilla County 12/11/20

Volcanoes Hazard Annex

Risk Score: 127

Risk Level: Medium

A volcano is an opening in the Earth's crust that allows molten rock, gases, and debris to escape to the surface.[1] Volcanoes are present in Washington, Oregon, and California where volcanic activity is generated by continental plates moving against each other (see the Earthquake Annex). Because the population of the Pacific Northwest is rapidly expanding, and scientists have increased their knowledge about the threats from the volcanoes of the Cascade Mountain Range, more people are aware of the dangers of these mountains.[2] In the Cascade Range vicinity, the number of people at immediate risk during volcanic eruptions is greater than at any other volcanic area within the United States. The 2010 census states that more than 10 million people live in Washington and Oregon.[3]

Besides the hazards, volcanoes provide benefits such as fertile soil, valuable metallic minerals, geothermal resources, and scenic beauty. They produce volcanic products that are used as building or road-building materials, as abrasive and cleaning agents, and as raw materials for many chemical and industrial uses. Soil rich in mineral nutrients and beautiful scenery encourages humans to settle in areas with volcanoes.[4]

In the *2014 Umatilla County NHMP*, volcanoes were not scored and had no rank. In the *2021 Umatilla County NHMP*, volcanoes scored 127 and ranked eighth out of nine hazards (removed weather emergencies and added air quality).

Causes and Characteristics of Volcanic Eruption

Umatilla County, and the Pacific Northwest, lie within the "ring of fire," an area of very active volcanic activity surrounding the Pacific Basin. Volcanic eruptions occur regularly along the ring of fire, in part because of the movement of the Earth's tectonic plates. The Earth's outermost shell, the lithosphere, is broken into a series of slabs known as tectonic plates. These plates are rigid, but they float on a hotter, softer layer in the Earth's mantle. As the plates move about on the layer beneath them, they spread apart, collide, or slide past each other. Volcanoes occur most frequently at the boundaries of these plates and volcanic eruptions occur when the hotter, molten materials, or magma, rise to the surface.

The primary threat to lives and property from active volcanoes is from violent eruptions that unleash tremendous blast forces, generate mud and debris flows, and produce flying debris and ash

[1] FEMA, *Be Prepared for a Volcano*, https://www.fema.gov/media-library-data/1533576019429-bb1357b03a5a2993bd8ee37767e47d86/Volcano_InfoSheet_080118.pdf

[2] Dzurisin, Dan, Peter H. Stauffer, and James W. Hendley II, *Living with Volcanic Risk in the Cascades*, USGS Fact Sheet 165-97, https://pubs.usgs.gov/fs/1997/fs165-97/fs165-97.pdf

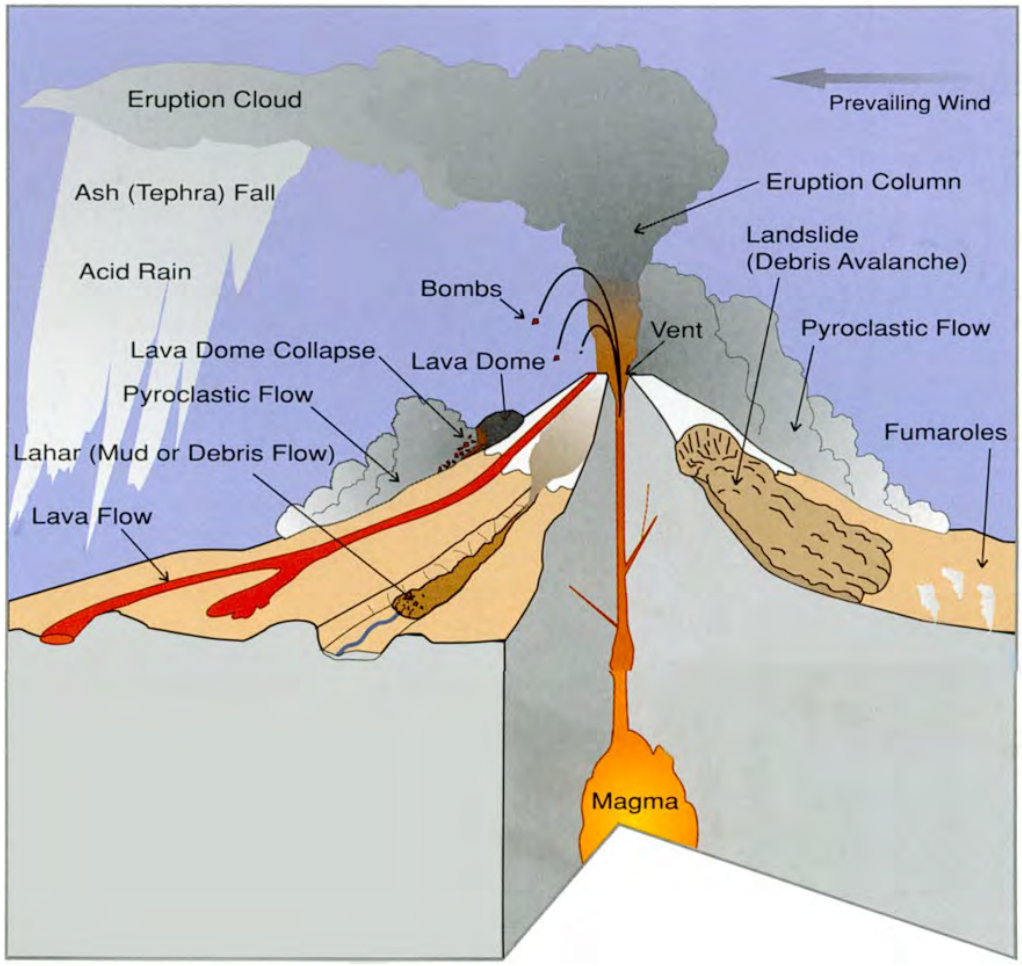
[3] USGS, *Volcano Hazards in the Cascade Range*, https://volcanoes.usgs.gov/observatories/cvo/hazards.html

[4] USGS, *What are some Benefits of Volcanoes?* https://www.usgs.gov/faqs/what-are-some-benefits-volcanic-eruptions?qt-news_science_products=0#qt-news_science_products

clouds. The immediate danger area in a volcanic eruption generally lies within a 20-mile radius of the blast site. The following section outlines the specific hazards posed by volcanoes.

Volcanoes are commonly conical hills or mountains built around a vent that connect with reservoirs of molten rock below the surface of the earth.[5] Some younger volcanoes may connect directly with reservoirs of molten rock, while most volcanoes connect to empty chambers. Unlike most mountains, which are pushed up from below, volcanoes are built up by an accumulation of their own eruptive products: lava or ash flows and airborne ash and dust. When pressure from gases or molten rock becomes strong enough to cause an upsurge, eruptions occur. Gases and rocks are pushed through the opening and spill over, or fill the air with lava fragments. Figure VO-1 diagrams the basic features of a volcano.

Figure VO-1 Volcanic Hazard from a Composite Type Volcano



Source: Walder et al, "Volcano Hazards in the Mount Jefferson Region," 1999; W.E. Scott, R.M. Iverson, S.P. Schilling, and B.J. Fischer, Volcano Hazards in the Three Sisters Region, Oregon: U.S. Geological Survey Open-File Report 99-437, 14p., 2001.,

[5] Tilling, Robert I., *Volcanoes*, USGS General Interest Publication, (1982), https://books.google.com/books/about/Volcanoes.html?id=5eVjblx7IC8C

Related Hazards

Ash / Tephra

Tephra consists of volcanic ash (sand-sized or finer particles of volcanic rock) and larger fragments. During explosive eruptions, tephra together with a mixture of hot volcanic gas are ejected rapidly into the air from volcanic vents. Larger fragments fall down near the volcanic vent while finer particles drift downwind as a large cloud. When ash particles fall to the ground, they can form a blanket-like deposit, with finer grains carried further away from the volcano. In general, the thickness of ash fall deposits decreases in the downwind direction. Tephra hazards include impact of falling fragments, suspension of abrasive fine particles in the air and water, and burial of structures, transportation routes and vegetation.

During an eruption that emits ash, the ash fall deposition is controlled by the prevailing wind direction. [6] The predominant wind pattern over the Cascades is from the west, and previous eruptions seen in the geologic record have resulted in most ash fall drifting to the east of the volcanoes. [7]

Earthquakes

Volcanic eruptions can be triggered by seismic activity or earthquakes can occur during or after a volcanic eruption. Earthquakes produced by stress changes are called volcano-tectonic earthquakes. These earthquakes, typically small to moderate in magnitude, occur as rock is moving to fill in spaces where magma is no longer present and can cause land to subside or produce large ground cracks.[8] In addition to being generated after an eruption and magma withdrawal, these earthquakes also occur as magma is intruding upward into a volcano, opening cracks and pressurizing systems.[9] Volcano-tectonic earthquakes do not indicate that the volcano will be erupting but can occur at any time and cause damage to manmade structures or provoke landslides.

Lava flows

Lava flows are streams of molten rock that erupt relatively non-explosively from a volcano and move downslope, causing extensive damage or total destruction by burning, crushing, or burying everything in their paths. Secondary effects can include forest fires, flooding, and permanent reconfiguration of stream channels. [10]

Pyroclastic flows and surges

Pyroclastic flows are avalanches of rock and gas at temperatures of 600 to 1500 degrees Fahrenheit. They typically sweep down the flanks of volcanoes at speeds of up to 150 miles per hour. Pyroclastic surges are a more dilute mixture of gas and rock. They can move even more rapidly than a pyroclastic flow and are more mobile. Both generally follow valleys, but surges sometimes have enough momentum to overtop hills or ridges in their paths. Because of their high speed, pyroclastic

[6] DLCD, *2020 Oregon State Natural Hazard Mitigation Plan*, Volcanic Hazards Chapter, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

[7] Ibid.

[8] Riley, Colleen M., *A Basic Guide to Volcanic Hazards*, Michigan Technological University, http://www.geo.mtu.edu/volcanoes/vc_web/overview/o_health.html.

[9] Scott, W. E., USGS Cascades Volcano Observatory, personal communication, 7/5/01.

[10] DLCD, *2020 Oregon State Natural Hazard Mitigation Plan*, Volcanic Hazards Chapter, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_00_Complete.pdf

flows and surges are difficult or impossible to escape. If it is expected that they will occur, evacuation orders should be issued as soon as possible for the hazardous areas. Objects and structures in the path of a pyroclastic flow are generally destroyed or swept away by the impact of debris or by accompanying hurricane-force winds. Wood and other combustible materials are commonly burned. People and animals may also be burned or killed by inhaling hot ash and gases. The deposit that results from pyroclastic flows is a combination of rock bombs and ash and is termed *ignimbrite.* These deposits may accumulate to hundreds of feet thick and can harden to resistant rock. [11]

Lahars and debris flows

Lahar is an Indonesian term that describes a hot or cold mixture of water and rock fragments flowing down the slopes of a volcano or river valley.[12] Lahars typically begin when floods related to volcanism are produced by melting snow and ice during eruptions of ice-clad volcanoes like Mount Shasta, and by heavy rains that may accompany eruptions. Floods can also be generated by eruption-caused waves that could overtop dams or move down outlet streams from lakes.

Lahars react much like flash flood events in that a rapidly moving mass moves downstream, picking up more sediment and debris as it scours out a channel. This initial flow can also incorporate water from rivers, melting snow and ice. By eroding rock debris and incorporating additional water, lahars can easily grow to more than ten times their initial size. But as a lahar moves farther away from a volcano, it will eventually begin to lose its heavy load of sediment and decrease in size.[13]

Lahars often cause serious economic and environmental damage. The direct impact of a lahar's turbulent flow front or from the boulders and logs carried by the lahar can easily crush, abrade, or shear off at ground level just about anything in the path of a lahar. Even if not crushed or carried away by the force of a lahar, buildings and valuable land may become partially or completely buried by one or more cement-like layers of rock debris. By destroying bridges and key roads, lahars can also trap people in areas vulnerable to other hazardous volcanic activity, especially if the lahars leave deposits that are too deep, too soft, or too hot to cross.[14]

Volcanic Landslides (debris avalanches)[15]

Landslides – or debris avalanches – are a rapid downhill movement of rocky material, snow, and/or ice. Volcanic landslides range in size from small movements of loose debris on the surface of a volcano to massive collapses of the entire summit or sides of a volcano. Steep volcanoes are susceptible to landslides because they are built up partly of layers of loose volcanic rock fragments. Landslides on volcano slopes are triggered not only by eruptions, but also by heavy rainfall or large earthquakes that can cause materials to break free and move downhill.

[11] Ibid.

[12] USGS, Volcano Hazards Program, *Understanding Volcanoes Can Save Lives*, http://volcanoes.usgs.gov/Hazards/What/Lahars/lahars.html.

[13] Ibid.

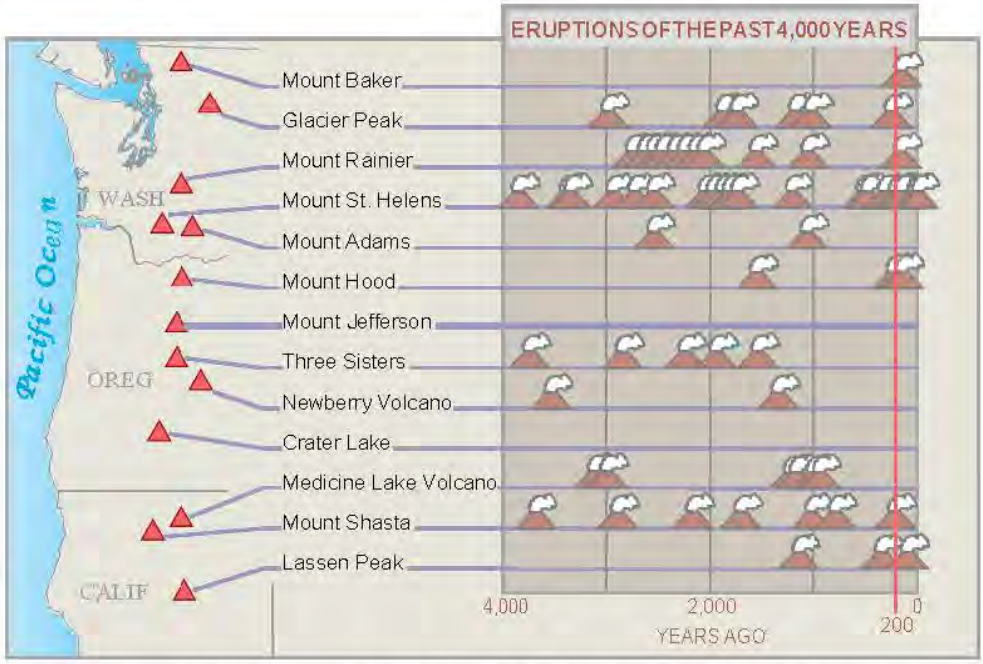
[14] Ibid.

[15] Wright and Pierson, Living With Volcanoes, USGS Volcano Hazards Program Circular 1973, (1992).

History of Volcanic Events in Umatilla County

Although there have been no recent volcanic events in the Umatilla County area, it is important to note the area is active and susceptible to eruptive events since the region is a part of the volcanically active Cascade Mountain Range. Figure VO-2 displays the potentially active volcanoes of the western United States as identified by the USGS.

Figure VO-2 Potentially Active Volcanoes of the Western United States



Of the 13 potentially active volcanoes in the Cascade Range of the Pacific Northwest, 11 have erupted in the past 4,000 years. More than 100 eruptions, most of which were explosive, have occurred during that period, making the volcanoes of the Cascade Range some of the most hazardous in the United States. Each eruption symbol in the diagram represents from one to several eruptions closely spaced in time at or near the named volcano. Eruptions have also occurred from other vents (not shown) scattered throughout the Cascade Range, especially in central Oregon and southwestern Washington.

Source: Dzurisin, Dan, Peter H. Stauffer, and James W. Hendley II, *Living with Volcanic Risk in the Cascades*, USGS Fact Sheet 165-97, https://pubs.usgs.gov/fs/1997/fs165-97/fs165-97.pdf

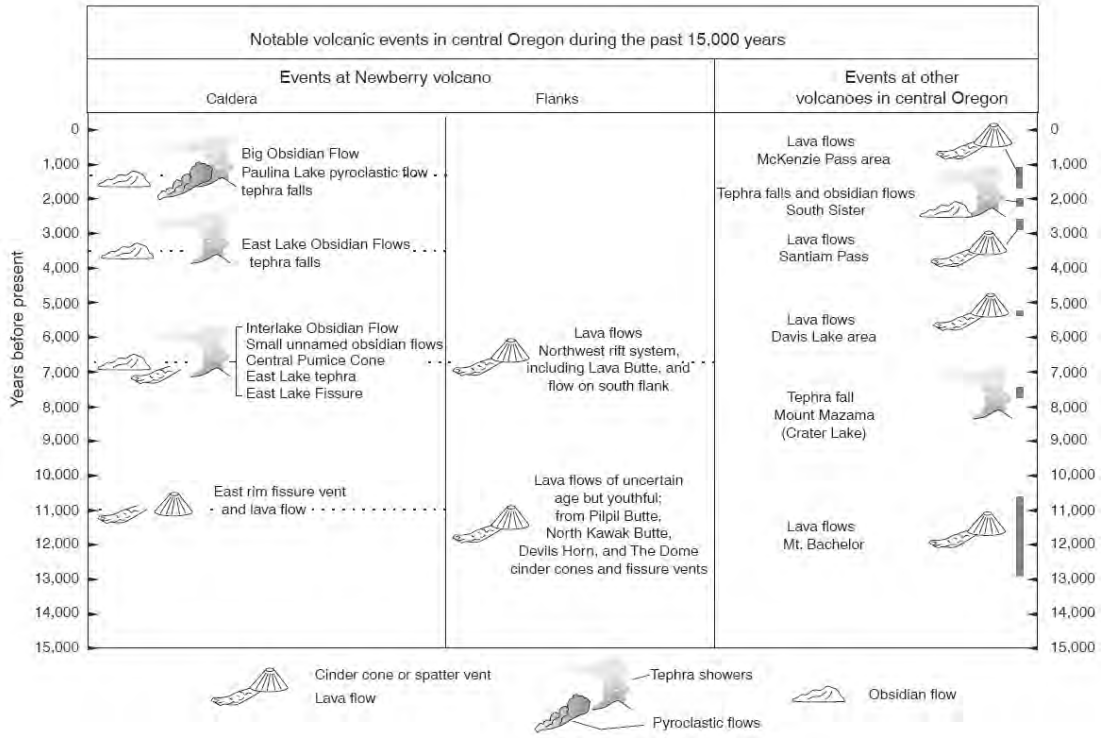
There are six active volcanic areas that could potentially impact Umatilla County and the broader region. These include: Mt. Saint Helens, Mt. Hood, Newbery Volcano, Mt. Bachelor, Three Sisters and Mt. Broken Top, and Mt. Mazama/ Crater Lake. All of these are in the very high threat category except Mt. Bachelor which is a moderate threat.[16]

Volcanoes in the Cascade Mountain Range have been erupting for hundreds of thousands of years. Newberry Volcano, for example, has had many events in the last 15,000 years as shown Figure VO-3. The Three Sisters region has also had some activity during this time while the last major eruptive activity at Mt. Mazama occurred approximately 7,700 years ago, forming Crater Lake in its wake. Some of the most recent events include Big Obsidian Flow at Newberry Volcano. All of the Cascade

[16] USGS, *2018 Update to the U.S. Geological Survey National Volcanic Threat Assessment*, https://pubs.usgs.gov/sir/2018/5140/sir20185140.pdf.

Range volcanoes are characterized by long periods of quiescence and intermittent activity. And these characteristics make predictions, recurrence intervals, or probability very difficult to ascertain.

Figure VO-3 Notable Volcanic Events in Central Oregon during the Past 15,000 Years



Source: D.R. Sherrod, L.G. Mastin, W.E. Scott, and S.P. Schilling, 1997, *Volcano Hazards at Newberry Volcano, Oregon: U.S. Geological Survey Open-File Report 97-513*, https://pubs.er.usgs.gov/publication/ofr97513.

In addition to the many online sources of information, a detailed report of the Pacific Northwest's catastrophic hazards and history written by Rick Gore appears in the May 1998 National Geographic, Vol. 193, No. 5. Table VO-1 describes volcanic events in Oregon and Washington.

Table VO-1 Significant Historic Volcanic Events

Date	Location	Description
About 18,000 to 7,7000 YBP	Mount Bachelor, central Cascades	Cinder cones and lava flows.
About 20,000 to 13,000 years before present (YBP)	Polallie eruptive episode, Mount Hood	Lava dome, pyroclastic flows, lahars, and tephra.
About 13, 000 YBP	Lava Mountain, south central Oregon	Lava Mountain field and lava flows.
About 13,000 YBP	Devils Garden, south central Oregon	Devils Garden field and lava flows.
About 13,000 YBP	Four Craters, south central Oregon	Four Craters field and lava flows.
About 7,780 to 15,000YBP	Cinnamon Butte, Southern Cascades	Balsatic scaria cone and lava flows.

Date	Location	Description
About 7,700 YBP	Crater Lake Caldera	Formation of Crater Lake caldera, pyroclastic flows, and widespread ashfall.
About 7,7000 YBP	Parkdale, north central Oregon	Eruption of Parkdale lava flow.
About 7,000 YBP	Diamond Craters, eastern Oregon	Lava flows and tephra in Diamond Craters field.
About <7,700 YBP; 5,300 to 5,600 YBP	Davis Lake, southern Cascades	Lava flows and scoria cones in Davis Lake field.
About 10,000 to <7,7000 YBP	Cones south of Mount Jefferson; Forked Butte and South Cinder Peak	Lava flows.
About 4,000 to 3,000 YBP	Sand Mountain, central Cascades	Lava flows and cinder cones in Sand Mountain field.
About <3,2000 YBP	Jordan Craters, eastern Oregon	Lava flows and tephra in Jordan Craters field.
About 3,000 to 1,5000 YBP	Belknap Volcano, central Cascades	Lava flows and tephra.
About 2,000 YBP	South Sister Volcano	Rhyolite lava flow.
About 1,500 YBP	Timberline eruptive period, Mount Hood	Lava dome, pyroclastic flows, lahars, and tephra.
About 1,300 YBP	Newberry Volcano, central Oregon	Eruption of Big Obsidian flow.
About 1,300 YBP	Blue Lake Crater	Spatter cones and tephra.
1760–1810	Crater Rock/Old Maid Flat on Mount Hood	Pyroclastic flows in upper White River; lahars in Old Maid Flat; dome building at Crater Rock.
1859/1865	Crater Rock on Mount Hood	Steam explosions and tephra falls.
1907 (?)	Crater Rock on Mount Hood	Steam explosions.
1980	Mount St. Helens (Washington)	Mt. St. Helens erupts: Debris avalanche, ashfall, and flooding on Columbia River. 57 people died.
1981-1986	Mount St. Helens (Washington)	Lava dome growth, steam, and lahars.
1989-2001	Mount St. Helens (Washington)	Hydrothermal explosions.
2004-2008	Mount St. Helens (Washington)	Lava dome growth, steam, and ash.

Sources: USGS, n.d.; Wolfe and Pierson, 1995; Scott et al, 1997; University of Oregon, *2014 Umatilla County NHMP*; DLCD, *Oregon NHMP*, 2020; FEMA, Disaster Declarations for Oregon, retrieved 2017.

Mount St. Helen's Case Study

On May 18, 1980, following two months of earthquakes and minor eruptions and a century of dormancy, Mount St. Helens in Washington, exploded in one of the most devastating volcanic eruptions of the 20th century. Although less than 0.1 cubic mile of magma was erupted, 58 people died, and damage exceeded 1.2 billion dollars. Fortunately, most people in the area were able to evacuate safely before the eruption because the U.S. Geological Survey (USGS) and other scientists had alerted public officials to the danger. As early as 1975, USGS researchers had warned that Mount St. Helens might soon erupt. Coming more than 60 years after the last major eruption in the

Cascade Range (Lassen Peak), the explosion of St. Helens was a spectacular reminder that the millions of residents of the Pacific Northwest share the region with live volcanoes.[17]

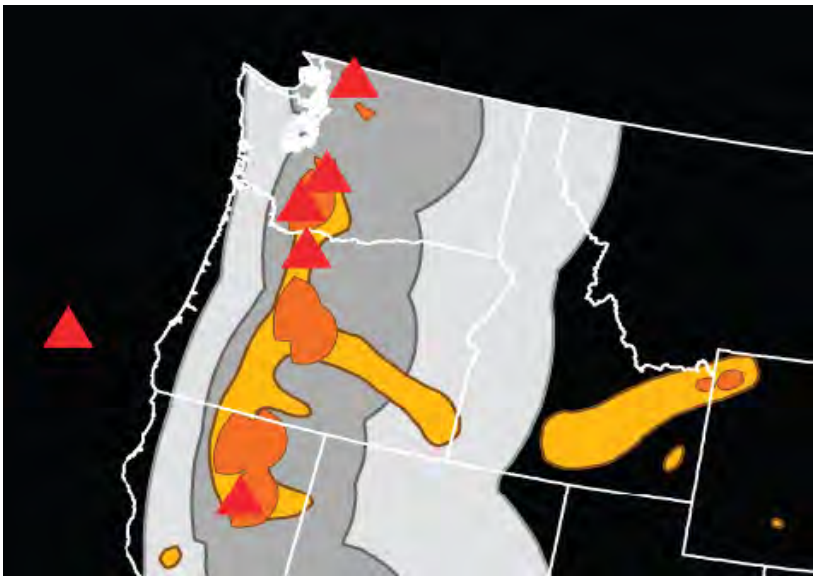
Risk Assessment

How are Hazards Identified?

Communities that are closer to volcanoes may be at risk to the proximal hazards – ash fall, debris avalanches, pyroclastic flows, lahars, and lava flows - as well as the distal hazards - lahars, lava flows, and ash fall. The communities that are farther away are most likely only at risk from the distal hazards, (mainly ash fall). Figure VO-4 shows the locations of some of the Cascade Range volcanoes (red triangles) with relative volcanic hazard zones. The dark orange areas have a higher volcanic hazard; light-orange areas have a lower volcanic hazard. Dark-grey areas have a higher ash fall hazard; light-grey areas have a lower ash fall hazard.

Geologic hazard maps have been created for most of the volcanoes in the Cascade Range by the USGS Volcano Program at the Cascade Volcano Observatory in Vancouver, WA and are available at http://vulcan.wr.usgs.gov/Publications/hazards_reports.html.

Figure VO-4 National Volcanic Hazard Map



Note: The red triangles are volcano locations. Dark-orange areas have a higher volcanic hazard; light-orange areas have a lower volcanic hazard. Dark-gray areas have a higher ash fall hazard; light-gray areas have a lower ash fall hazard. Information is based on data during the past 10,000 years.

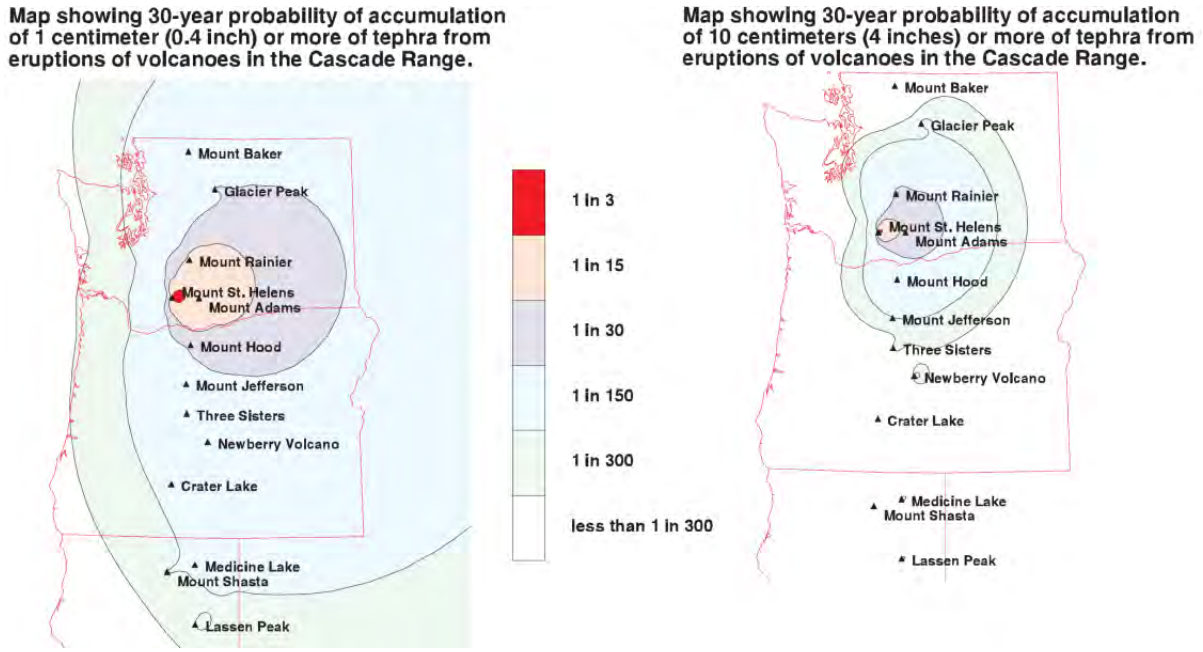
Source: Image modified from USGS, *Volcano Hazards – A National Threat, Fact Sheet 2006-3014*, https://pubs.usgs.gov/fs/2006/3014/2006-3014.pdf

Scientists also use wind direction to predict areas that might be affected by volcanic ash. During an eruption that emits ash, the ash fall deposition is controlled by the prevailing wind direction. The predominant wind pattern over the Cascade Range originates from the west, and previous eruptions seen in the geologic record have resulted in most ash fall drifting to the east of the volcanoes.

[17] Dzurisin, Dan, Peter H. Stauffer, and James W. Hendley II, *Living with Volcanic Risk in the Cascades*, USGS Fact Sheet 165-97, https://pubs.usgs.gov/fs/1997/fs165-97/fs165-97.pdf

Regional tephra fall shows the annual probability of ten centimeters or more of ash accumulation from Pacific Northwest volcanoes. Figure VO-5 depicts the potential and geographic extent of volcanic ash fall from several volcanoes in the Pacific Northwest.

Figure VO-5 Probable Geographic Extent of Volcanic Ashfall from Select Volcanic Eruptions in the Pacific Northwest



Source: Scott, W.E., Pierson, T.C., Schilling, S.P., Costa, J.E., Gardner, C.A., Vallance, J.W., & Major, J.J. (1997), *Volcano Hazards in the Mount Hood region (Hazard Zonation Map for Mt. Hood), Oregon: USGS Open-File Report 97-89*, Reston, VA, http://vulcan.wr.usgs.gov/Volcanoes/Hood/Hazards/ OFR97-89/OFR97-89.pdf

An excellent resource on volcanoes is published by USGS, most recently in 2018, which is called the *National Volcanic Threat Assessment*. The USGS assesses active and potentially active volcanoes in the U.S., focusing on history, hazards and the exposure of people, property and infrastructure to harm during the next eruption. They use 24 factors to obtain a score and threat ranking for each volcano that is deemed potentially eruptible.[18]

In a description on the USGS website "the update names 18 very high threat, 39 high threat, 49 moderate threat, 34 low threat, and 21 very low threat volcanoes. The volcanoes are in Alaska, Arizona, California, Colorado, Hawaii, Idaho, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming, American Samoa and the Commonwealth of the Northern Mariana Islands. The threat ranking is not an indication of which volcano will erupt next. Rather, it indicates how severe the impacts might be from future eruptions at any given volcano."[19]

The website further states, "Since 1980, there have been 120 eruptions and 52 episodes of notable volcanic unrest at 44 U.S. volcanoes. When erupting, all volcanoes pose a degree of risk to people

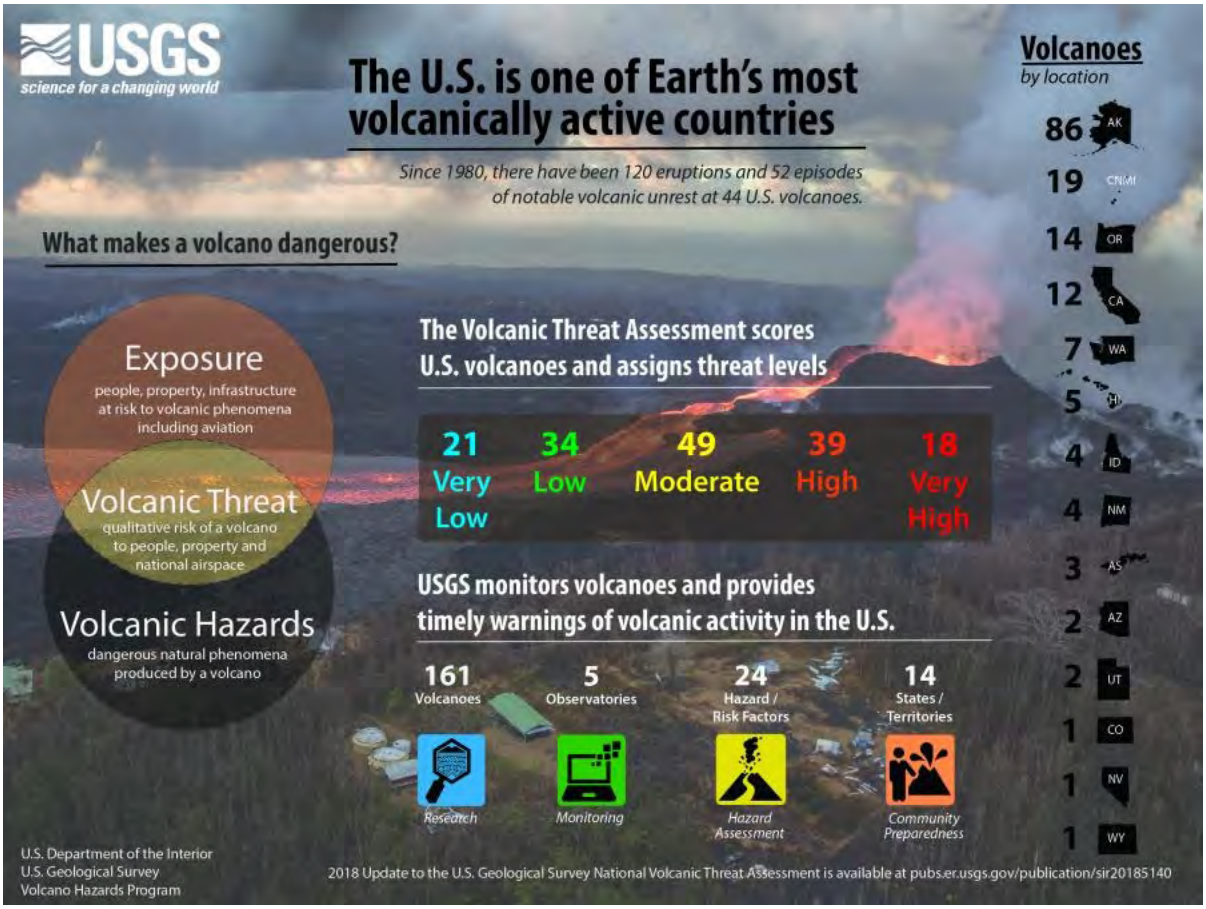
[18] USGS, *The U.S. is one of Earth's most Volcanically Active Countries*, https://volcanoes.usgs.gov/index.html.

[19] Ibid.

and infrastructure. However, the risks are not equivalent from one volcano to another because of differences in eruptive style and geographic location."[20]

The USGS describes that the volcanic threat assessment "helps prioritize U.S. volcanoes for research, hazard assessment, emergency planning, and volcano monitoring. It is a way to help focus attention and resources where they can be most effective, guiding the decision-making process on where to build or strengthen volcano monitoring networks and where more work is needed on emergency preparedness and response."[21]

Figure VO-6 Volcanic Threat Assessment Statistics



Source: USGS, *The U.S. is one of Earth's most Volcanically Active Countries*, https://volcanoes.usgs.gov/index.html

Hazard Risk Analysis

The Umatilla County NHMP Steering Committee completed a Hazard Vulnerability Assessment/Analysis (HVA) on October 27, 2020. This was described in Section 2 Risk Assessment. The method used for the HVA was developed from a Federal Emergency Management Agency (FEMA) tool that has been refined by the Oregon Office of Emergency Management (OEM). It addresses and weights (shown as percent within parentheses) probability (29%), vulnerability (21%),

[20] Ibid.

[21] Ibid.

maximum threat (42%) and the history (8%) of each natural hazard and attributes a final hazard analysis score. The methodology produces scores that range from 24 to 240.

For local governments, conducting the HVA is a useful step in planning for hazard mitigation. The method provides the jurisdiction with a relative ranking from which to prioritize mitigation actions, but does not predict the occurrence of a particular hazard.

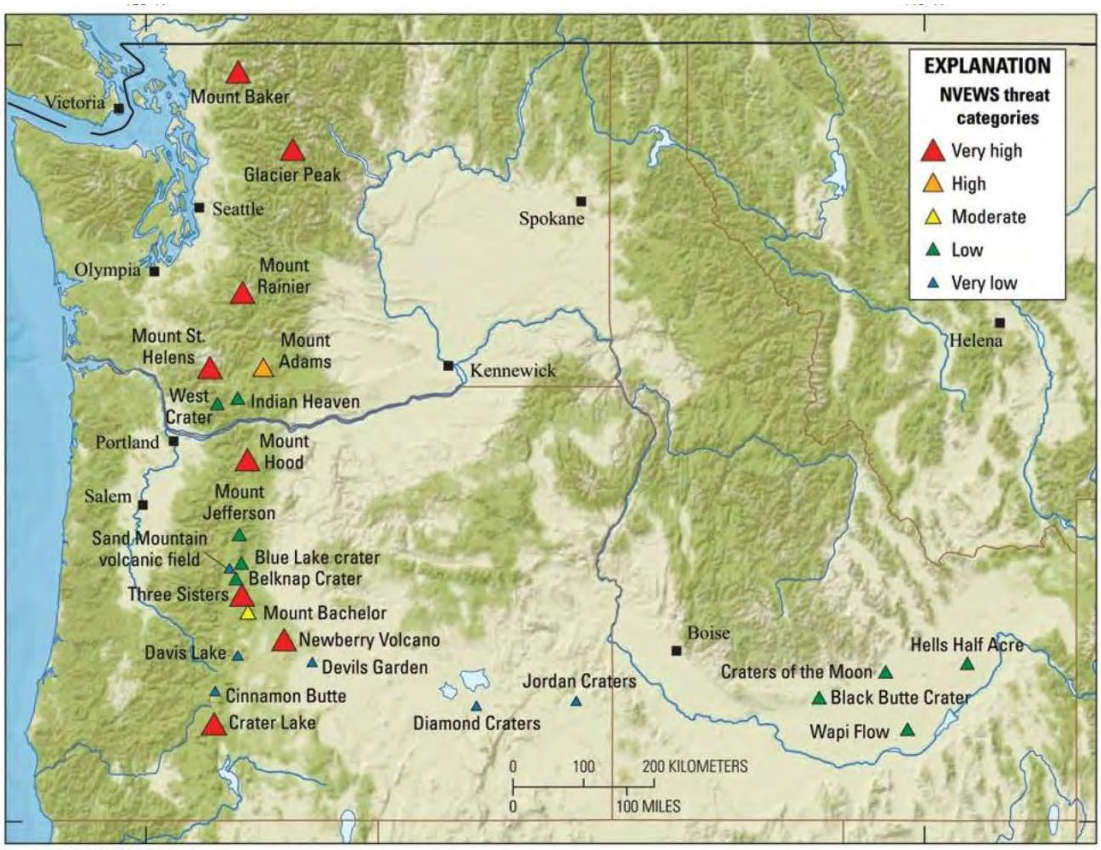
In the *2014 Umatilla County NHMP*, volcanoes were not scored and had no rank. In the *2021 Umatilla County NHMP*, volcanoes scored 127 and ranked eighth out of nine hazards (removed weather emergencies and added air quality).

For more information on all the risk scores and ranks of the natural hazards, see Volume I Basic Plan, Section 2 Risk Assessment of this NHMP.

Probability Assessment

There are six active volcanic areas that could potentially impact Umatilla County and the broader region. These include: Mt. Hood, Mt. Saint Helens, Newbery Volcano, Mt. Bachelor, Three Sisters and Mt. Broken Top, and Mt. Mazama/ Crater Lake. See Figure VO-7.

Figure VO-7 Map Showing Volcano Locations within the Area of Responsibility of the Cascades Volcano Observatory



Source: USGS, *2018 Update to the U.S. Geological Survey National Volcanic Threat Assessment*, https://pubs.usgs.gov/sir/2018/5140/sir20185140.pdf

Mt. St. Helens remains a probable source of airborne tephra as shown in the figures above. It has repeatedly produced voluminous amounts of this material and has erupted much more frequently in recent geologic time than any other Cascade volcano. It blanketed Yakima and Spokane, Washington during the 1980 eruption and again, in 2004.[22]

The eruptive history of the nearby Cascade volcanoes to this region can be traced to late Pleistocene times (approximately 700,000 years ago) and will no doubt continue. But the central question remains: When? The most recent series of events at Newberry Volcano, which occurred about 1,300 years ago, consisted of lava flows and tephra fall. Newberry Volcano's recent history also includes pyroclastic flows and numerous lava flows. Volcanoes in the Three Sisters region, such as Middle and South Sister, and Crater Lake have also erupted explosively in the past. These eruptions have produced pyroclastic flows, lava flows, lahars, debris avalanches, and tephra. Any future eruptions at these volcanoes would most likely resemble those that have occurred in the past.[23]

Geoscientists have provided some estimates of future activity in the vicinity of Newberry Caldera and its adjacent areas. They estimate a 1 in 3000 chance that some activity will take place in a 30-year period. The estimate for activity at Crater Lake for the same time period is significantly smaller at 0.003 to 0.0003. In the Three Sisters region, the probability of future activity is roughly 1 in 10,000 but any restlessness would greatly increase this estimate. [24]

The Umatilla County NHMP Steering Committee noted that the area is not highly vulnerable to direct volcanic hazards such as blast effects, relatively nearby volcanoes could inundate the area with ashfall sufficient to impact transportation and cause widespread health concerns. Potentially the area could be an area of refuge if other areas have a volcanic eruption disaster.

Vulnerability Assessment

All of the Pacific Northwest is vulnerable to impacts from volcanic activity. Like the rest of Eastern Oregon, Umatilla County has some risk of being impacted by volcanic activity in the Cascade Range. The principal sources are Mt. Hood, Mt. Saint Helens, Newbery Volcano, Mt. Bachelor, Three Sisters and Mt. Broken Top, and Mt. Mazama/ Crater Lake. Because of its geographic distance from these volcanic sites, Umatilla County is not at risk for proximal hazards such as lava flows. However, it is at risk for distal hazards, primarily ash fall (tephra). The location, size, and shape of the area affected by tephra fall is determined by both the vigor and duration of the eruption and the wind direction at the time of eruption, making prediction of the area to be affected impossible more than a few hours in advance. The vulnerability to ash fallout is multi-pronged; for example ash can disrupt the engines of motor vehicles, reduce visibility, and exacerbate or induce respiratory illnesses.

While a quantitative vulnerability assessment - an assessment that describes number of lives or amount of property exposed to the hazard - has not yet been conducted for Umatilla County volcanic eruption events, there are many qualitative factors - issues relating to what is in danger within a community - that point to potential vulnerability.

[22] USGS, *2018 Update to the U.S. Geological Survey National Volcanic Threat Assessment*, https://pubs.usgs.gov/sir/2018/5140/sir20185140.pdf, and the USGS website

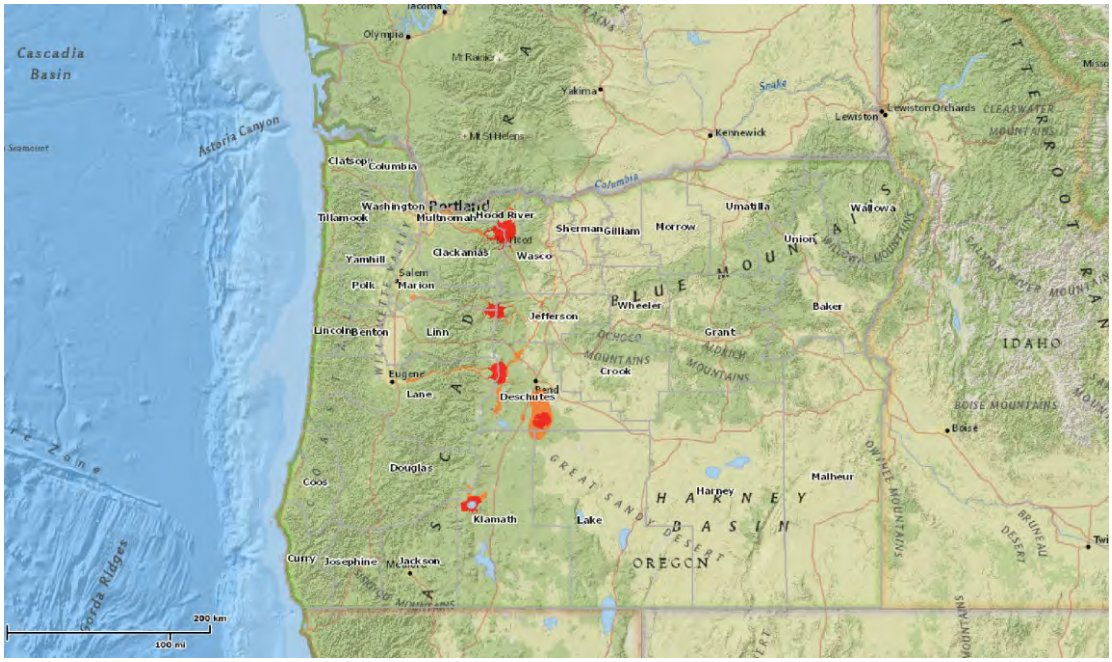
[23] Ibid.

[24] Ibid.

Figure VO-8 shows that that Umatilla County is not within an identified high or moderate volcanic event hazard zone. DOGAMI used data from the USGS Cascades Volcano Observatory (CVO) for this web application. CVO maintains proximal and distal hazard zone data for volcanic areas in the Western Cascades of Oregon. These areas include but are not limited to Mount St. Helens, Mount Hood, Crater Lake, Newberry, Mount Jefferson, and the Three Sisters.[25] HazVu shows two hazard zones: the high hazard zone (proximal zone) and moderate hazard zone (distal zone). Mt. Bachelor, which is listed as a moderate threat by the USGS,[26] is a dormant volcano monitored by the Jaffe Group at the University of Washington at Bothell.[27]

For Umatilla County, the largest vulnerability in terms of volcanic hazards lies in ash fallout from a volcanic event in the Cascades. Ash can disrupt the engines of motor vehicles and can affect vulnerable populations such as people with asthma. In Umatilla County, as in other Oregon counties, should an event force highways to close, the County could be isolated.[28]

Figure VO-8 Map of Generalized Vulnerability of the Region



Source: DOGAMI HazVu: Statewide Geohazards Viewer

Risk Analysis

Many parts of Oregon, including this region, are susceptible to volcanic hazards, particularly in the portions close to the volcano centers of the Three Sisters region, Newberry Crater and Crater Lake. Volcanoes can pose significant threats to people and infrastructure. As population growth continues

[25] USGS, *Cascades Volcano Observatory*, https://volcanoes.usgs.gov/observatories/cvo/cascade_volcanoes.html.

[26] USGS, *2018 Update to the U.S. Geological Survey National Volcanic Threat Assessment*, https://pubs.usgs.gov/sir/2018/5140/sir20185140.pdf

[27] University of Washington, *INTEX-B 2006: Mount Bachelor Observatory*, https://atmos.washington.edu/~thornton/MBO.html

to expand and development becomes closer to the potentially active volcanoes, greater losses from volcanic hazards are likely to result. The level of risk from volcanic hazards can be determined through the comparison of the overlap of hazard and exposure.

Based on the HVA and information such as the *Emergency Operations Plan*, and collective memory, the Umatilla County NHMP Steering Committee determined the overall risk score of 127. The HVA identified that the history of volcanic events is low, with 1 or 0 events occurring over the last 100 years. The maximum threat of a volcanic event is high; considering the percentage of population and property that could be impacted under a worst-case scenario is greater than 25%. The vulnerability is high and the probability is low. The evaluation of these factors - history, maximum threat, vulnerability, and probability - resulted in the risk score of 127. See the Hazard Vulnerability Analysis in the Risk Assessment in Section 2 of Volume I of this *2021 Umatilla County NHMP*.

Community Hazard Issues

What is susceptible to damage during a hazard event?

Volcanic eruptions can send ash airborne, spreading the ash for hundreds or even thousands of miles. An erupting volcano can also trigger flash floods, earthquakes, rockfalls, and mudflows. Volcanic ash can contaminate water supplies, cause electrical storms, and collapse roofs.[29]

Businesses and individuals can make plans to respond to volcano hazards. Planning is prudent because once an emergency begins, public resources (e.g. local governments, non-profits, and schools) can be overwhelmed, and people will need to make informed decisions and provide for themselves. Knowledge of volcano hazards can help citizens make a plan of action based on the relative safety of areas around home, school, and work.[30]

Building and Infrastructure Damage

Buildings and other property in the path of a flash flood, debris flow, or tephra fall can be damaged. Thick layers of ash can weaken roofs and cause collapse, especially if wet. Clouds of ash often cause electrical storms that start fires or damp ash can short-circuit electrical systems and disrupt radio communication.

Pollution and Visibility

Tephra fallout from an eruption column can blanket areas within a few miles of the vent with a thick layer of pumice. High-altitude winds may carry finer ash tens to hundreds of miles from the volcano, posing a hazard to flying aircraft, particularly those with jet engines. In an extreme situation, the airports in Umatilla County such as but not limited to the Eastern Oregon Airport at Pendleton and the Hermiston Municipal Airport might need to close to prevent the detrimental effect of fine ash on jet engines and for pilots to avoid total impaired visibility. Fine ash in water supplies will cause brief muddiness and chemical contamination.

[29] Dzurisin, Dan, Peter H. Stauffer, and James W. Hendley II, *Living With Volcanic Risk in the Cascades*, USGS Fact Sheet 165-97, (2000), https://pubs.usgs.gov/fs/old.1997/fs165-97/.

[30] Scott, W.E. et al, *Volcano Hazards in the Three Sisters Region, Oregon*, USGS Open-File Report 99-437, (2001), https://pubs.er.usgs.gov/publication/ofr99437.

Economic Impacts

Volcanic eruptions can disrupt the normal flow of commerce and daily human activity without causing severe physical harm or damage. Ash a few millimeters thick can halt traffic, possibly up to one week, and cause rapid wear of machinery, clog air filters, block drains and water intakes, and can kill or damage agriculture.

Transportation of goods between Umatilla County and nearby communities and trade centers could be deterred or halted. Airport closures can disrupt airline schedules for travelers. Fine ash can cause short circuits in electrical transformers, which in turn cause electrical blackouts. Volcanic activity can also force nearby recreation areas to close for safety precautions long before the activity ever culminates into an eruption. The interconnectedness of the region's economy would be disturbed after a volcanic eruption due to the interference of tephra fallout with transportation.

Death and Injury

Inhalation of volcanic ash can cause respiratory discomfort, damage or result in death for sensitive individuals who are miles away from the cone of a volcano. Likewise, emitted volcanic gases such as fluorine and sulfur dioxide can kill vegetation for livestock or cause a burning discomfort in the lungs. Hazards to human life from debris flows are burial or impact by boulders and other debris.

County and City Statement

Potential hazards resulting from a volcanic eruption include damage from seismic activity and damage to health and property resulting from ash deposits. Therefore, when addressing existing response and mitigation activities to mitigate potential damage from volcanic events we must include the activities associated with hazard response, advanced warning and seismic protection. An important tool for advanced warning is the AlertSense system. See Appendix G Umatilla County Success Stories for a description of the AlertSense system.

Existing Hazard Mitigation Activities and Resources

USGS and DOGAMI

A major existing strategy to address volcanic hazards is to publicize and distribute volcanic hazard maps and information through DOGAMI and USGS.

The volcanoes most likely to constitute a hazard to Oregon communities have been the subject of USGS research. Open-file reports (OFR) address the geologic history of these volcanoes and lesser-known volcanoes in their immediate vicinity. These reports also cover associated hazards, the geographic extent of impacts, and possible mitigation strategies. They are available for the active volcanoes near Umatilla County: Mount Saint Helens, Three Sisters, Newberry Volcano, and Crater Lake. While there is not an OFR for Mt. Bachelor, there are other resource materials that provide considerable information. Umatilla County is only at risk for tephra (ash) fall from these volcanoes, should these volcanoes become active enough to raise concerns.

Of note, after the 1980 eruption of Mount St. Helens, Congress provided increased funding that enabled the USGS to establish a volcano observatory for the Cascade Range. Located in Vancouver, Washington, the David A. Johnston Cascades Volcano Observatory (CVO) was named for a USGS

scientist killed at a forward observation post by the May 18, 1980, eruption (https://pubs.usgs.gov/fs/1997/fs165-97/fs165-97.pdf).

USGS, https://volcanoes.usgs.gov/index.html

DOGAMI, https://www.oregongeology.org/volcano/volcanoes.htm

State Natural Hazard Risk Assessment

The risk assessment in the *2020 Oregon Natural Hazards Mitigation Plan* provides an overview of volcanic hazards in Oregon and identifies the most significant volcanic eruptions in Oregon's recorded history. It has overall state and regional information, and includes volcano related mitigation actions for the entire state.
https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_05b_RAState.pdf

Emergency Operations Plans

Umatilla County Emergency Management (UCEM) coordinates with NOAA NWS when notices may be required to inform response agencies and the general public of emergency events. UCEM response and coordination is outlined in the Umatilla County *Emergency Operations Plan* and usually involves disseminating materials addressing shelter locations, response contact information and other information. Should an emergency event become severe, UCEM can activate the Emergency Operations Center (EOC) and Joint Information Center (JIC) to coordinate emergency response, evacuation and the dissemination of important public safety information.[31]

The *Umatilla County EOP*, dated January 2012 (ordinance 2012-01 passed 1/18/12), is an all-hazard plan that describes how Umatilla County will organize and respond to emergencies and disasters in the community. It is based on, and is consistent with Federal, State of Oregon, and other applicable laws, regulations, plans, and policies, including the National Response Framework, and State of Oregon Emergency Operations Plan. The *Umatilla County EOP* is one component of the County's emergency management program and is designed to be compliant with the National Incident Management System.

The *Umatilla County EOP* consists of a Basic Plan, Emergency Support Function Annexes that complement the Federal and State Emergency Support Functions, Support Annexes, and Incident Annexes. It provides a framework for coordinated response and recovery activities during an emergency. It describes how agencies and organizations in Umatilla County will coordinate resources and activities with other Federal, State, local, tribal, and private-sector partners.[32] The *Umatilla County EOP* does not include volcanoes as a hazard.

Umatilla County Emergency Operations Plan, http://www.co.umatilla.or.us/bcc/codes/35.pdf

[31] *2014 Umatilla County NHMP*, May 2015

[32] Ecology and Environment, Inc., *Umatilla County Emergency Operations Plan*, January 2012.

Future Changing Conditions/ Climate Change

In the *2021 Umatilla County NHMP*, there are several locations that describe future changing conditions or climate change as it relates to the natural hazards that impact Umatilla County and the cities. In the order of appearance in the NHMP: the Risk Assessment, the Hazards Annexes, and Appendix E contain this information. Within Appendix E there are two documents, the *Future Climate Projections: Umatilla County* and the *Climate Change Two-Page*r.

Volcanic Event Mitigation Actions

There is one volcanic events specific mitigation action that have been identified by the Umatilla County NHMP Steering Committee. The mitigation action has a medium priority because the Hazard Vulnerability Assessment (HVA) resulted in volcanic events having a medium risk score and medium risk level. There are multi-hazard mitigation actions for the NHMP and several of those include volcanic related mitigation actions, in conjunction with the other hazards. The multi-hazard mitigation actions are a high priority.

In discussion with the NHMP Steering Committee, it was agreed that the risk level rankings from the HVA would be used as the way to prioritize the multi-hazard and hazard-specific mitigation actions. The risk level rankings are in Table 2-4 in Section 2 Risk Assessment.

See Table 3-1, Umatilla County NHMP Mitigation Actions for a more detailed description of the mitigation actions in this NHMP.

Landslides/Debris Flows Hazard Annex

Risk Score: 85

Risk Level: Low

Causes and Characteristics of Landslides

Landslides are a geologic hazard in almost every state in America. Nationally, landslides cause 25 to 50 deaths each year.[1] In Oregon, economic losses due to landslides for a typical year are estimated to be over $10 million.[2] In years with heavy storms, such as in 1996, losses can be an order of magnitude higher and exceed $100 million.[3] In Oregon, a significant number of locations are at risk to dangerous landslides. While not all landslides result in private property damage, many landslides impact infrastructure such as transportation corridors, fuel and energy conduits, and communication facilities. They can also pose a serious threat to the lives of humans and animals, and to the environment.

In the *2014 Umatilla County NHMP*, landslides were not scored and thus unranked in the list of nine hazards. In the *2021 Umatilla County NHMP*, the Steering Committee ranked landslides ninth out of nine hazards (removed weather emergencies and added air quality).

Types of Landslides

Landslides are downhill or lateral movements of rock, debris, or soil mass. Landslides vary greatly in the volumes of rock and soil involved, the length, width, and depth of the area affected, frequency of occurrence, and speed of movement. Some characteristics that determine the type of landslide are slope of the hillside, moisture content, and the nature of the underlying materials. Landslides are given different names depending on the type of failure and their composition and characteristics. All landslides can be classified into six types of movement: 1) falls, 2) topples, 3) slides, 4) spreads, 5) flows, and 6) complex. See Figure LS-1 for illustration of landslide types.[4]

Although the factors determining what type of movement will manifest for any given landslide are very complex, the topographic nature of the slope and the type of slope material often play dominant roles. Most slope failures are complex combinations of these distinct types, but the generalized groupings provide a useful means for framing discussion of the type of hazard and potential mitigation alternatives. Movement type should be combined with other landslide characteristics such as type of material, rate of movement, depth of failure, and water content in order to more fully understand the landslide behavior. For a more complete description of the different types of landslides, see U.S. Transportation Research Board *Special Report 247* (Turner and

[1] Mileti, Dennis. 1999. *Disasters by Design: A Reassessment of Natural Hazards in the United States*. Washington D.C.: Joseph Henry Press.

[2] Wang, Yumei, Renee D. Summers, R. Jon Hofmeister, and Oregon Department of Geology and Mineral Industries. 2002. *Open-File Report O-02-05: Landslide Loss Estimation Pilot Project in Oregon*. https://www.oregongeology.org/pubs/ofr/O-02-05.pdf, accessed February 14, 2010 and reaffirmed January 22, 2019.

[3] Ibid.

[4] Bill Burns, DOGAMI, personal communication, January 2019.

Schuster, 1996), which has an extensive chapter on landslide types and processes.[5] It is common for failures to reoccur where previous ones happened; this is true for all types of landslide movements and over periods much longer than human recorded history.

Figure LS-1 Landslide Types

DOGAMI, *Oregon Geology Fact Sheet: Landslide Hazards in Oregon*, https://www.oregongeology.org/pubs/fs/landslide-factsheet.pdf

[5] Turner, A. K., and Schuster, R. L., eds., 1996, *Landslides: Investigation and Mitigation*, National Research Council, Transportation Research Board Special Report 247, 673 p.

Slides

Slides move in contact with the underlying surface. These movements include rotational slides where sliding material moves along a curved surface and translational slides where movement occurs along a flat surface. These slides are generally slow moving and can be deep. Slow-moving landslides can occur on relatively gentle slopes and can cause significant property damage, but are far less likely to result in serious injuries than rapidly moving landslides.[6]

Topples and Falls

Rock falls occur when blocks of material come loose on steep slopes. Weathering, erosion, or excavations, such as those along highways, can cause falls where the road has been cut through bedrock. They are fast moving with the materials free falling or bouncing down the slope.

In falls, material is detached from a steep slope or cliff. The volume of material involved is generally small, but large boulders or blocks of rock can cause significant damage. Rock falls have the potential to break off power poles located on hillsides.[7]

Spreads

Spreads are an extension and subsidence of commonly cohesive materials overlying layers. They are commonly triggered by earthquakes. Spreads usually occur on gentle slopes near open bodies of water.[8]

Flows

Flows are plastic or liquid movements in which land mass (e.g. soil and rock) breaks up and flows during movement. Earthquakes often trigger flows.[9] Flows can be channelized and unchannelized, and may also be called debris avalanches and earth flows. Debris flows normally occur when a landslide moves downslope as a semi-fluid mass scouring, or partially scouring soils from the slope along its path. Flows are typically rapidly moving and also tend to increase in volume as they scour out the channel. [10] Flows often occur during heavy rainfall, can occur on gentle slopes, and can move rapidly for large distances.

The channelized debris flow, which is sometimes referred to as “rapidly moving landslide” can be life threatening. They often initiate on a steep slope, move into a steep channel (or drainage), increase in volume by incorporating channel materials, and then deposit material, usually at the mouth of the channel on existing fans. Debris flows are commonly mobilized by other types of landslides that occur on slopes near a channel. They can also initiate within channels from accelerated erosion during heavy rainfall or snow melt (Bill Burns, personal communication, January 2019).

[6] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, 2020 Oregon NHMP

[7] Ernie, Eichorn, Field Representative, Chemawa District, Bonneville Power Authority, personal communication, November 10, 2004.

[8] DOGAMI, *Oregon Geology Fact Sheet: Landslide Hazards in Oregon*, https://www.oregongeology.org/pubs/fs/landslide-factsheet.pdf

[9] Robert Olson Associates, June 1999, *Metro Regional Hazard Mitigation Policy and Planning Guide*.

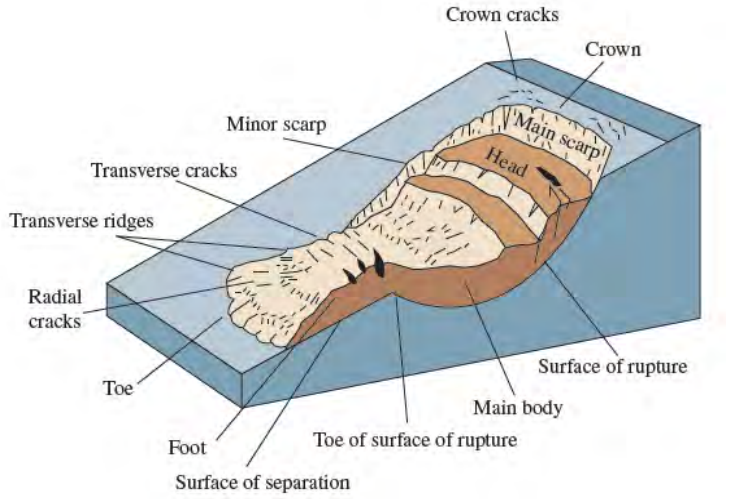
[10] Ibid.

Over time, ditches and culverts beneath hillside roads can become blocked with debris. If the ditches are blocked, run-off from the slopes is inhibited during periods of precipitation. This causes the run-off water to collect in soil, and in some cases, cause a slide. Usually the slides are small (100 – 1,000 cubic yards), but they can be quite large.

Complex

Complex landslides are the combinations of two or more types. A common complex landslide is a slump-earth flow, which usually exhibits slump features in the upper region and earth flow features near the toe.[11]

Figure LS-2 Landslide Features



Source: USGS, Landslide Factsheet, https://pubs.usgs.gov/fs/2004/3072/pdf/fs2004-3072.pdf

Conditions Affecting Landslides

Natural conditions and human activities can both play a role in causing landslides. Certain geologic formations are more susceptible to landslides than others. The incidence of landslides and their impact on people and property can be accelerated by development. Those who are uninformed about geologic conditions and processes may create conditions that can increase the risk of or even trigger landslides.

These are the principal factors that affect or increase the likelihood of landslides:

- Natural conditions and processes including the geology of the site, rainfall, rapid snow melt, freeze/thaw cycles, wave and water action, seismic tremors and earthquakes and volcanic activity.
- Excavation and grading on sloping ground for homes, roads and other structures.
- Drainage and groundwater alterations that are natural or human-caused can trigger landslides. Human activities that may cause slides include broken or leaking water or

[11] Burns, Bill and Ian Madin, DOGAM, *Protocol for Inventory Mapping of Landslide Deposits from Light Detection and Ranging (LIDAR) Imagery*, Special Paper 42, 2009, https://www.oregongeology.org/pubs/dds/slido/sp-42_onscreen.pdf.

sewer lines, water retention facilities, irrigation and stream alterations, ineffective stormwater management and excess runoff due to increased impervious surfaces.

- Change or removal of vegetation on very steep slopes due to timber harvesting, land clearing and wildfire.
- Any combination of these factors.[12]

History of Landslides in Umatilla County

Most of Oregon's landslide damage has been associated with severe winter storms where landslide losses can exceed $100 million in direct damage such as the February 1996 event. Annual average maintenance and repair costs for landslides in Oregon are over $10 million.[13] Eight deaths occurred during the 1996 and 1997 storm events, when heavier than normal rains caused thousands of landslides throughout Oregon. Those storm events resulted in the identification of roughly 9,500 landslides and those were added to a database. Some of these landslides were the reactivation of ancient and historically active landslides and some were new failures.

Table LS-1 Significant Historic Landslides/Debris Flows

Date	Location	Description
Dec. 1964	Statewide	DR-184. Heavy rains and flooding, with landslides, on December 24, 1964.
Feb. 1996	Statewide	DR-1099. Heavy rains and rapidly melting snow contributed to hundreds of landslides / debris flows across the state; many occurred on clear cuts that damaged logging roads.
Dec. 2003-Jan. 2004	Statewide	DR-1510. Winter storms with landslides.
Dec. 2005 to Jan. 2006	Statewide	DR-1632. Statewide impacts from storms, floods, landslides, and mudslides.
Dec. 2008	Statewide	DR-1824. Severe winter storm, flooding, winds, record and near record snow, landslides and mudslides. Gresham received, 26" of snow. Many roads closed. Significant damages to public infrastructure, homes and businesses. Event occurred Dec. 20-26.
Jan. 2011	Statewide	DR-1956. Severe winter storm, flooding, mudslides, landslides, and debris flows.
Jan. 2012	W. Oregon	DR-4055. The incident was January 12-21, 2012. Severe winter storm with flooding, landslides, and mudslides. Declaration involves 12 counties including Benton, Columbia, Coos, Curry, Douglas, Hood River, Lane, Lincoln, Linn, Marion, Polk, and Tillamook.
Dec. 2015	W. Oregon	DR-4258. December 6-23, 2015.Severe Winter Storms, Straight-Line winds, Flooding, Landslides, and Mudslides. Declaration involves the counties of Clatsop, Columbia, Tillamook, Washington, Multnomah, Clackamas, Yamhill, Polk, Lincoln, Linn, Lane, Douglas, Coos, and Curry.
Jan. 2017	W. and Central Oregon	DR-4328. January 7-10, 2017. Severe Winter Storms, Flooding, Landslides, and Mudslides. Declaration involved the counties of Hood River, Columbia, Deschutes, and Josephine.
Feb. 2019	W. Oregon	DR-4432. February 23-23, 2019. Severe Winter Storms, Flooding, Landslides, and Mudslides. Declaration involves the counties of Jefferson, Lane, Douglas, Coos, and Curry.

[12] *DOGAMI, Oregon Geology Fact Sheet: Landslide Hazards in Oregon*, https://www.oregongeology.org/pubs/fs/landslide-factsheet.pdf

[13] Wang and Chaker, DOGAMI, 2004, *Geological Hazards Study for the Columbia River Transportation Corridor*, Open File Report OFR 0-4-08, https://www.oregongeology.org/pubs/ofr/O-04-08.pdf.

Date	Location	Description
Apr. 2019	Statewide	DR-4452. April 6-21, 2019. Severe Storms, Flooding, Landslides, and Mudslides. Declaration involves the counties of Linn, Douglas, Curry, Umatilla, Wheeler, and Grant.
Feb. 2020	E. Oregon	DR-4519. February 5-9, 2020. Severe Storms, Flooding, Landslides, and Mudslides. Declaration involves the counties of Umatilla, Wallowa, and Union and the Confederated Tribes of Umatilla Reservation Oregon.

Source: University of Oregon, *2014 Umatilla County NHMP*; DLCD, *Oregon NHMP*, 2020; FEMA, Disaster Declarations for Oregon, retrieved 3/3/21;

DOGAMI maps the State Landslide Information Layer for Oregon (SLIDO). The database contains only landslides that have been located on these maps. Many landslides have not yet been located or are not on these maps and therefore are not in this database. This database does not contain information about relative hazards[14].

Compared to other natural hazards with the potential to affect Umatilla County and a proven history of past damages, landslides are not considered a major hazard.

The maps in Figure LS-3 and LS-4 show the vast majority of Umatilla County to be at low risk for landslide activity, though the map also shows a fair amount of moderate and high susceptibility. Much of those areas are away from cities. The information is based on SLIDO (version 3.4) and the *2016 Landslide Susceptibility Overview Map of Oregon* with its corresponding *Open File Report, O-16-02* (https://www.oregongeology.org/pubs/ofr/p-O-16-02.htm). Historically, no severe landslide events have occurred and been recorded in Umatilla County. Steering Committee members did not identify any events; see the Vulnerability Assessment below.

Risk Assessment

How are Hazards Identified?

Geologic and geographic factors are important in identifying landslide-prone areas. Stream channels, for example, have major influences on landslides, due to undercutting of slopes by stream erosion and long-term hillside processes. The severity or extent of landslides is typically a function of geology and the landslide triggering mechanism. Even small slides can cause property damage, result in environmental destruction, and cause injuries or death to people and animals.

The Oregon Department of Forestry (ODF) *Storm Impacts and Landslides of 1996: Final Report* conducted after the 1996-97 landslide events found that the highest probability for the initiation of shallow, rapidly moving landslides was on slopes of 70 to 80 percent steepness. A moderate hazard of shallow rapid landslide initiation can exist on slopes between 50 and 70 percent.[15]

Areas at risk to landslides do not always have steep slopes (25 percent or greater,) or a history of nearby landslides. As indicated by the DOGAMI *Open File Report O-16-02* and *Special Paper 42*, both previously mentioned, landslide hazards may be more effectively recognized using Light Detection

[14] DOGAMI, Statewide Landslide Information Database for Oregon (SLIDO 3.4). https://www.oregongeology.org/slido/index.htm

[15] Oregon Department of Forestry, *Storm Impacts and Landslides of 1996: Final Report*, June 1999. https://digital.osl.state.or.us/islandora/object/osl%3A19728

and Ranging Imagery (LIDAR or lidar). Using lidar to craft inventory maps as well as shallow and deep susceptibility maps provides a substantial amount of information on the location and nature of the landslide hazards. Further mapping of Umatilla County for landslides hazards is recommended.

Probability of Future Occurrence

Hazard Risk Analysis

The Umatilla County NHMP Steering Committee completed a Hazard Vulnerability Assessment/Analysis (HVA) during this NHMP update. This was described in Section 2 Risk Assessment. The method used for the HVA was developed from a Federal Emergency Management Agency (FEMA) tool that has been refined by the Oregon Office of Emergency Management (OEM). It addresses and weights (shown as percent within parentheses) probability (29%), vulnerability (21%), maximum threat (42%) and the history (8%) of each natural hazard and attributes a final hazard analysis score. The methodology produces scores that range from 24 to 240.

For local governments, conducting the HVA is a useful step in planning for hazard mitigation. The method provides the jurisdiction with a relative ranking from which to prioritize mitigation actions, but does not predict the occurrence of a particular hazard.

In the *2014 Umatilla County NHMP*, landslides were not scored and thus unranked in the list of nine hazards. In the *2021 Umatilla County NHMP*, the Steering Committee ranked landslides ninth out of nine hazards (removed weather emergencies and added air quality).

For more information on all the risk scores and ranks of the natural hazards, see Volume I Basic Plan, Section 2 Risk Assessment of this NHMP.

Probability Assessment

As has been noted in this Annex already, many factors contribute to the probability of landslides. The probability of an area to have a landslide is increased depending on the factors that reduce the stability without causing failure. When several of these factors are combined, such as an area with steep slopes, weak geologic material, and previous landslide movement, the probability of future landslides is increased. There is a strong correlation between intensive winter rainstorms and the occurrence of rapidly moving landslides (debris flows). The Oregon Department of Forestry tracks storms during the rainy season, monitors rain gauges and snow melt, and issues warnings as conditions warrant. Other agencies such as ODOT, DOGAMI, USGS, and National Weather Service also track weather conditions and potential landslide situations.

Vulnerability Assessment

To a large degree, landslides are very difficult to predict. Vulnerability assessments assist in predicting how different types of property and population groups will be affected by a hazard.[16] The optimum method for doing this analysis at the city or county level is to use parcel-specific assessment data on land use and structures.[17] Data that includes specific landslide-prone and debris

[16] Burby, R., ed. 1998, *Cooperating with Nature.*

[17] Ibid.

flow locations in the county can be used to assess the population and total value of property at risk from future landslide occurrences.

Landslides can occur on their own or in conjunction with other hazards, such as flash flooding. Depending upon the type, location, severity and area affected, severe property damage, injuries and loss of life can be caused by landslide hazards. Landslides can damage or temporarily disrupt utility services, block off or damage roads, critical lifeline services such as police, fire, medical, utility and communication systems, and emergency response.

While Umatilla County has rarely experience major landslides, there are areas in the County that are potentially vulnerable such as road cuts, steeply sloped areas, and those areas indicated as landslide prone on the Landslide Susceptibility map in Figure LS-4.

Community Hazard Issues

What is susceptible to damage during a hazard event?

Depending upon the type, location, severity and area affected, severe property damage, injuries and loss of life can be caused by landslide hazards. Landslides can damage or temporarily disrupt utility services, roads and other transportation systems and critical lifeline services such as police, fire, medical, utility and communication systems, and emergency response. In addition to the immediate damage and loss of services, serious disruption of roads, infrastructure and critical facilities and services may also have longer term impacts on the economy of the community and surrounding area.

These factors can increase the risk to people and property from the effects of landslides:

- Improper excavation practices, sometimes aggravated by drainage issues, can reduce the stability of otherwise stable slopes.

- Allowing development on or adjacent to existing landslides or known landslide-prone areas raises the risk of future landslides, regardless of excavation and drainage practices. Homeowners and developers should understand that in many potential landslide areas, there are no development practices that can completely assure slope stability from future landslide events.

- Building on fairly gentle slopes can still be subject to landslides that begin a long distance away from the development. Sites at greatest risk are those situated against the base of very steep slopes, in confined stream channels (small canyons), and on fans (rises) at the mouth of these confined channels. Home siting practices do not cause these landslides, but rather put residents and property at risk of landslide impacts. In these cases, the simplest way to avoid such potential effects is to locate development out of the impact area, or construct debris flow diversions for the structures that are at risk.

- Certain forest practices can contribute to increased risk of landslides. Forest practices may alter the physical landscape and its vegetation, which can affect the stability of steep slopes. Physical alterations can include slope steepening, slope-water effects, and changes in soil strength. Of all forest management activities, roads have the greatest effects on slope stability, although changing road construction and maintenance practices are reducing the effects of forest roads on landslides.

- High rainfall accumulation in a short period of time increases the probability of landslide. An extreme winter storm can produce inches of rainfall in a 24 hour period; if the storm occurs well into the winter season, when the ground is already saturated, the hydraulic overload effect is heightened.

County and City Specific Information

Chapter 10 of the Umatilla County Comprehensive Plan is entitled *Natural Hazards; it* includes a policy to monitor development in the Multiple Use Exception Areas where slopes are greater than 25%. Chapter 152.503 of the Umatilla County Development Code implements the Comprehensive Plan policy through a "Steep Slope (SS)" Overlay Zone. The Steep Slope Overlay Zone is only applicable to the Multiple Use Forest Exception Areas. In addition to structural development restrictions, the Steep Slope Overlay Zone implements road development standards on areas prone to landslides as well as limits excavation and removal of vegetation to encourage soil stability.

The Steep Slope Overlay Zone is a good attempt to prevent development from being in harm's way, but Umatilla County has lacked sufficient funds to accurately map areas that the zone would apply too. The lack of mapping technology requires staff to rely on a signed affidavit from an applicant that states that the development will meet the Steep Slope Overlay standards. More accurate information is necessary to assure that the development code is protecting the intent of the Comprehensive Plan.

Some, but not all of the cities also have Comprehensive Plan and Zoning Code provisions related to landslide hazards.

Existing Hazard Mitigation Activities

Existing Hazard Mitigation Activities and Resources

State Natural Hazard Risk Assessment

The risk assessment in the *2020 Oregon Natural Hazards Mitigation Plan* provides an overview of landslide risk in Oregon and identifies the most significant landslides in Oregon's recorded history. It has overall state and regional information, and includes landslide mitigation actions for the entire state. https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_05b_RAState.pdf

Planning for Natural Hazards: Oregon Technical Resource Guide

This guide describes basic mitigation strategies and resources related to landslides and other natural hazards, including examples from communities in Oregon.
https://scholarsbank.uoregon.edu/xmlui/handle/1794/1909

Oregon Department of Forestry (ODF)

According to the *Forest Facts: Landslides and Debris Flows* handout on their website, "the Oregon Department of Forestry regulates forest practices to manage landslide risk in order to protect the public's safety. Forest Practices Act rules for timber harvesting and constructing roads help minimize surface erosion and the potential for landslides, which provides protection for natural resources. ODF's geotechnical specialists assist foresters and landowners by providing guidance and assessing

the landslide hazards and risks. Protections include such measures as prohibiting timber harvest, specifying how trees should be replanted or roads should be constructed, leaving trees and vegetation undisturbed along streams, and requiring that trees be harvested with a skyline cable logging system, rather than using ground-based equipment" https://www.oregon.gov/ODF/Documents/AboutODF/LandslidesDebrisFlowsFactsheet.pdf.

The ODF debris flow maps include locations subject to naturally occurring debris flows and include the initiation sites and locations along the paths of potential debris flows (confined stream channels and locations below steep slopes). These maps neither consider the effects of management-related slope alterations (drainage and excavation) that can increase the hazard, nor do they consider very large landslides that could possibly be triggered by volcanic or earthquake activity. Areas identified in these maps are not to be considered "further review areas" as defined by Senate Bill 12 (1999).[18]

Oregon Department of Geology and Mineral Industries (DOGAMI)

The Oregon Department of Geology and Mineral Industries (DOGAMI) "works to increase understanding of Oregon's geologic resources and hazards through science and stewardship" (https://www.oregongeology.org/default.htm) and has many landslide related resources. https://www.oregongeology.org/Landslide/landslidehome.htm. Resources previously mentioned such as the *Landslide Hazards Fact Sheet*, SLIDO, and the *Landslide Susceptibility Overview Map* of Oregon with its corresponding *Open File Report, O-16-02*, are just a few of the items found on their website. DOGAMI also has the Oregon HazVu: Statewide Geohazard Viewer where you can type in an address and discover the geohazards impacting *that site. https://www.oregongeology.org/hazvu/*

In October 2019, DOGAMI and DLCD published the *Preparing for Landslide Hazards: A Land Use Guide for Oregon Communities* document, along with a Quick Reference version of it, and a webinar. This information can be found on DLCD's website and DOGAMI's website.

Debris Flow Warning System

The debris flow warning system was initiated in 1997 and involves collaboration between ODF, DOGAMI, the Oregon Department of Transportation (ODOT), local law enforcement, and National Oceanic and Atmospheric Administration (NOAA) Weather Radio and other media. ODF is primarily engaged with the lands it owns while the other agencies have a broader scope of engagement.

DOGAMI's website states, "Throughout the rainy season, the National Weather Service highlights the potential for debris flows and landslides as part of a flood watch, for areas included in the flood watch" (https://www.oregongeology.org/Landslide/debrisflow.htm). The information is provided by the National Weather Service (NWS) and broadcast via the NOAA Weather Radio, and on the Law Enforcement Data System. The information provided does not include the Debris Flow Warning System as originally designed. NWS provides the following language in their flood watches that highlights the potential for landslides and debris flows[19]:

> *A flood watch means there is a potential for flooding based on current forecasts. Landslides and debris flows are possible during this flood event. People, structures and roads located*

[18] ODF, *Western Oregon Debris Flow Hazard Maps: Methodology and Guidance for Map Use*, 1999 and DOGAMI, IMS-22, *GIS Overview Map of Potential Rapidly Moving Landslide Hazards in Western Oregon*, 2002.

[19] NOAA, NWS. Letter dated December 20, 2010 from Stephen K. Todd, Meteorologist-in-Charge.

below steep slopes, in canyons and near the mouths of canyons may be at serious risk from rapidly moving landslides.

DOGAMI provides information on debris flows through the media. ODOT provides warning signs to motorists in landslide prone areas during high-risk periods.

Oregon State Building Code Standards

The Oregon Building Codes Division adopts statewide standards for building construction that are administered by the state and local municipalities throughout Oregon. The *2017 Oregon Residential Special Code* (*ORSC*) contains requirements for one- and two-family dwellings (https://codes.iccsafe.org/content/document/1018?site_type=public) and the *2019 Oregon Structural Special Code* (*OSSC*) (https://codes.iccsafe.org/content/OSSC2019P1) contains provisions for grading and site preparation for the construction of building foundations.

Both codes contain requirements for cut, fill and sloping of the lot in relationship to the location of the foundation. There are also building setback requirements from the top and bottom of slopes. The codes specify foundation design requirements to accommodate the type of soils, the soil bearing pressure, and the compaction and lateral loads from soil and ground water on sloped lots.

The building official has the authority to require a soils analysis for any project where it appears the site conditions do not meet the requirements of the code, or that special design considerations must be taken. ORS 455.447 and the *OSSC* require a seismic site hazard report for projects that include essential facilities such as hospitals, fire and police stations and emergency response facilities, and special occupancy structures, such as large schools and prisons. This report includes consideration of any potentially unstable soils and landslides.[20]

Emergency Operations Plans

Umatilla County Emergency Management (UCEM) coordinates with NOAA NWS when notices may be required to inform response agencies and the general public of potential emergency events. UCEM response and coordination is outlined in the Umatilla County *Emergency Operations Plan* and usually involves disseminating materials addressing shelter locations, response contact information and other information. Should an emergency event become severe, UCEM is can activate the Emergency Operations Center (EOC) and Joint Information Center (JIC) to coordinate emergency response, evacuation and the dissemination of important public safety information.[21]

The *Umatilla County EOP*, dated January 2012 (ordinance 2012-01 passed 1/18/12), is an all-hazard plan that describes how Umatilla County will organize and respond to emergencies and disasters in the community. It is based on, and is consistent with Federal, State of Oregon, and other applicable laws, regulations, plans, and policies, including the National Response Framework, and State of Oregon Emergency Operations Plan. The *Umatilla County EOP* is one component of the County's emergency management program and is designed to be compliant with the National Incident Management System.

[20] DLCD and OPDR, *Planning for Natural Hazards: Oregon Technical Resource Guide*, July 2001, Chapter 5. https://scholarsbank.uoregon.edu/xmlui/handle/1794/1909

[21] *2014 Umatilla County NHMP*, May 2015

The *Umatilla County EOP* consists of a Basic Plan, Emergency Support Function Annexes that complement the Federal and State Emergency Support Functions, Support Annexes, and Incident Annexes. It provides a framework for coordinated response and recovery activities during an emergency. It describes how agencies and organizations in Umatilla County will coordinate resources and activities with other Federal, State, local, tribal, and private-sector partners.[22] The *Umatilla County EOP* includes landslides as a hazard.

Umatilla County Emergency Operations Plan, http://www.co.umatilla.or.us/bcc/codes/35.pdf

Future Changing Conditions/ Climate Change

In the *2021 Umatilla County NHMP*, there are several locations that describe future changing conditions or climate change as it relates to the natural hazards that impact Umatilla County and the cities. In the order of appearance in the NHMP: the Risk Assessment, the Hazards Annexes, and Appendix E contain this information. Within Appendix E there are two documents, the *Future Climate Projections: Umatilla County* and the *Climate Change Two-Pager*.

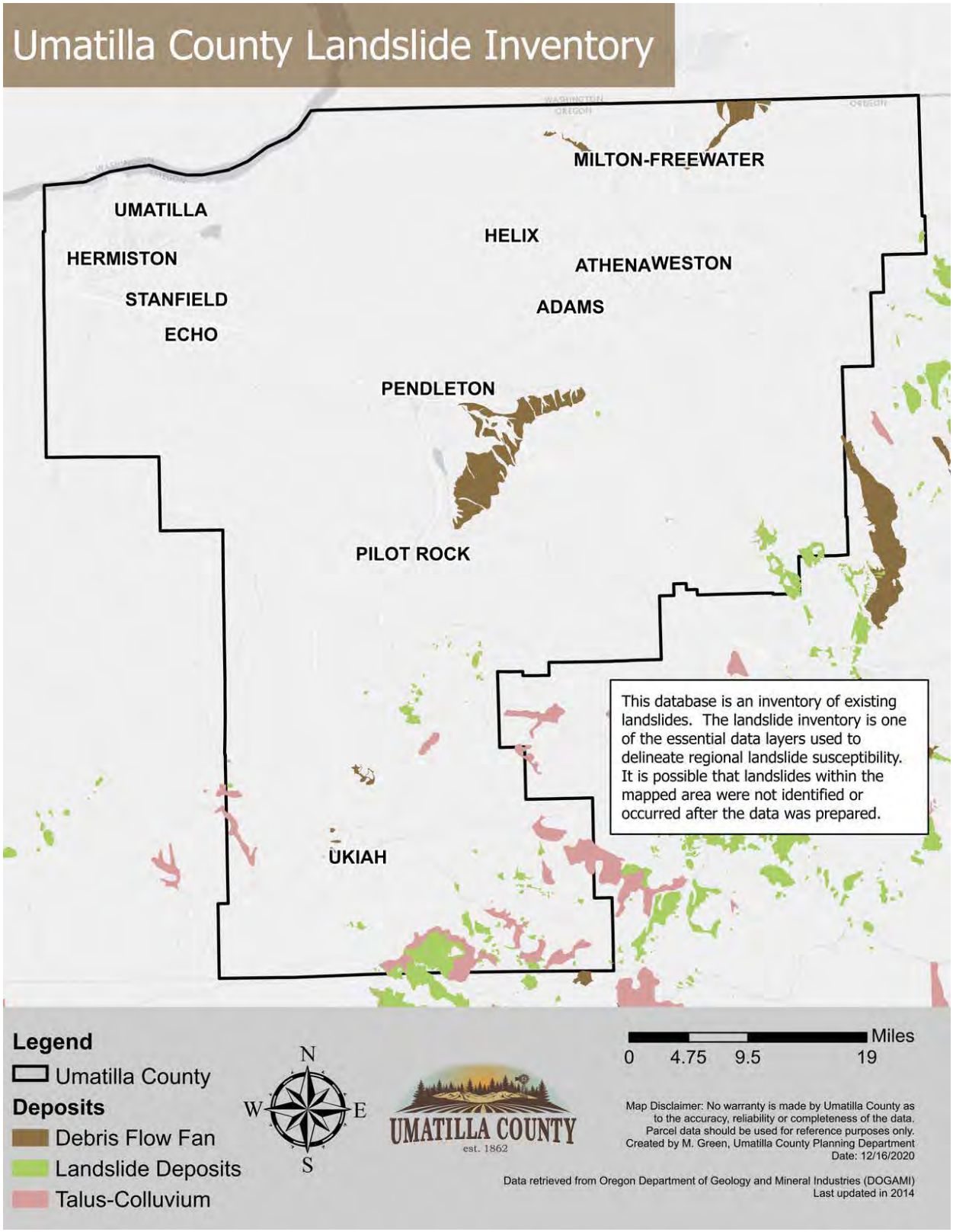
Landslide Mitigation Actions

There are two landslide specific mitigation actions that have been identified by the Umatilla County NHMP Steering Committee. Landslide hazards are low priority because the Hazard Vulnerability Assessment (HVA) resulted in landslides having a low risk level. In discussion with the NHMP Steering Committee, it was agreed that the risk level rankings from the HVA would be used as the way to prioritize the multi-hazard and hazard-specific mitigation actions. The risk level rankings are in Table 2-4 in Section 2 Risk Assessment.

There are multi-hazard mitigation actions for the NHMP and those include landslide related mitigation actions, in conjunction with the other hazards. The multi-hazard mitigation actions are a high priority. See Table 3-1, Umatilla County NHMP Mitigation Actions for a more detailed description of the mitigation actions in this NHMP.

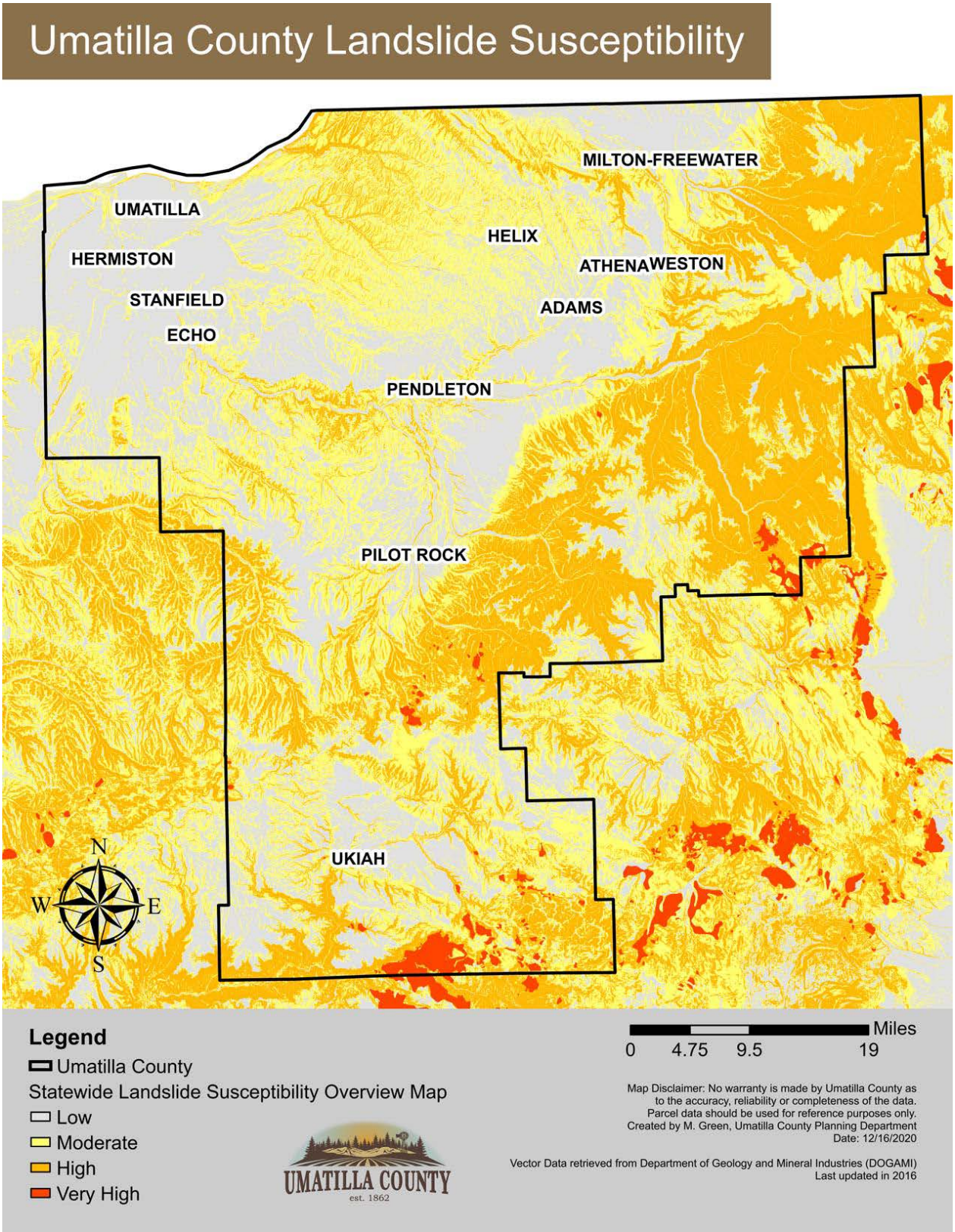
[22] Ecology and Environment, Inc., *Umatilla County Emergency Operations Plan*, January 2012.

Figure LS-3 Umatilla County Landslide Inventory



Source: Megan Green, Umatilla County, 12/16/20

Figure LS-4 Umatilla County Landslide Susceptibility



Source: Megan Green, Umatilla County, 12/16/20

Volume III: Mitigation Resources

Dust storm over Umatilla County farmland, September 2020, Credit: Pendleton National Weather

Source: Megan Green, Umatilla County, personal communication, 3/11/21

Damage after flooding near Maxwell Diversion Dam, April 2019, Credit: Hermiston Irrigation District (via OEM)

Source: Megan Green, Umatilla County, personal communication, 3/11/21

APPENDIX A:
PLANNING AND PUBLIC PROCESS

Table of Contents

Tables

Purpose

This Appendix describes the changes made to the *2014 Umatilla County Natural Hazards Mitigation Plan (NHMP)* during the plan update process that resulted in the *2021 Umatilla County NHMP*.

Project Background

Umatilla County partnered with the Oregon Department of Land Conservation and Development (DLCD) to update the *2014 Umatilla County Natural Hazards Mitigation Plan (NHMP).* This Multi-Jurisdictional Natural Hazards Mitigation Plan (NHMP) was developed through a partnership funded by the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP).

In 2020, the Department of Land Conservation and Development (DLCD) applied for and received the HMGP grant from DR-4432 from FEMA through the Oregon Office of Emergency Management (OEM) to assist Umatilla County, the twelve incorporated cities, and four special districts (identified as partners that are plan holders* because they have signed IGAs with DLCD) with the update to the expired *2014 Umatilla County NHMP*. This *2021 Umatilla County NHMP* is the result of a substantial collaborative effort between DLCD, Umatilla County, and all participating organizations (plan holders and others) The *2021 Umatilla County Natural Hazards Mitigation Plan* is structured to address the requirements contained in 44 CFR 201.6. Emphasis is placed on identifying and describing the unique attributes of the County, Cities, and Special Districts.

As has been described, briefly in the Executive Summary and in more detail in the Introduction, the Disaster Mitigation Act of 2000 requires communities to update their mitigation plans every five years to remain eligible for Building Resilient Infrastructure and Cities (BRIC), Flood Mitigation Assistance (FMA) program funding, and Hazard Grant Mitigation Program (HMGP) funding.

DLCD Natural Hazards Planner, Tricia Sears, met with members of the Umatilla County NHMP Steering Committee, led by Robert (Bob) Waldher, Umatilla County Planning Director and Tom Roberts, Umatilla County Emergency Manager, for this update to the *2014 Umatilla County NHMP*. A roster of the NHMP Steering Committee is included in the Acknowledgements section of this NHMP and in this Appendix.

2021 NHMP Update Changes and Integration of Information

The entire *2014 Umatilla County NHMP* has been revised and updated. In Table A-1, the sections of the *2014 Umatilla County NHMP* are compared and contrasted to the *2021 Umatilla County NHMP*. A more complete description of each of the sections is provided in the text after Table A-1.

Table A-1 Changes to Plan Organization

2014 Umatilla County NHMP	2021 Umatilla County NHMP
Cover, Acknowledgements	Cover, FEMA Approval Letters, Jurisdictional Resolutions,
Chapter 1: Planning Process	Acknowledgements, Table of Contents
Chapter 2: Umatilla County Action Plan	Executive Summary
Chapter 3: Community Profile	Volume I: Basic Plan
Chapter 4: Risk Assessment	Section 1: Introduction

Chapter 5: Natural Hazards Profile	Section 2: Risk Assessment
Multi-Hazard	Section 3: Mitigation Strategy
Wildfire	Section 4: Plan Implementation and Maintenance
Flood	Volume II: Hazard Annexes with Introduction
Severe Summer Storm	Floods
Severe Winter Storm	Air Quality (new in 2021)
Earthquake	Severe Summer Storms and Severe Winter Storms
Volcano	Wildfire
Landslide/Debris Flow	Drought
Drought	Earthquakes
Chapter 6: Glossary	Volcanoes
Chapter 7: Resource Directory	Landslides/Debris Flows
Chapter 8: FEMA Change Memo 2013	Volume III: Mitigation Resources
Chapter 9: Appendix	Appendix A: Planning and Public Process
Appendix A: Critical /Essential Facilities, Infrastructure, and Vulnerable Population Centers Risk Analysis	Appendix B: Community Profile
Appendix B: Community Wildfire Protection Plans: Blue Mountains CWPP, Mill Creek CWPP, and West County CWPP	Appendix C: Economic Analysis of Natural Hazards Mitigation Projects
Appendix C: Umatilla County Flood Mitigation Plan 2006	Appendix D: Grant Programs and Resources
Appendix D: Flood Fight Report and 2003 Revisions	Appendix E: Future Climate Projections Reports
Appendix E: Stakeholder Surveys Collected in2009	Appendix F: Umatilla County NHMP Hazards Maps Details
Appendix F: Natural Hazard Mitigation Plan Planning Chronology	Appendix G: Umatilla County NHMP Success Stories
Appendix G: OPDR Economic Analysis of Natural Hazard Mitigation Projects in 2009	Appendix H: Umatilla County Natural Hazards Mitigation Plan (NHMP) Natural Hazards Outreach Calendar
Chapter 10: City Addendums	Appendix I: Umatilla County Community Wildfire Protection Plans
Addendum 1: City of Adams Addendum 2: City of Pilot Rock Addendum 3: City of Umatilla	The partner plan holders' information is incorporated throughout the NHMP rather than in separate addenda or appendices. The partner plan holders are identified as such because they have signed IGAs with DLCD for the work on this NHMP. They are listed below in the Public Participation Process and in several locations in the NHMP.

Source: Tricia Sears, DLCD

The entire *2014 Umatilla County NHMP* was reviewed, revised, and updated. The *2021 Umatilla County NHMP* is based on information that has been researched, and the information is integrated into the NHMP. The sources of information are documented as footnotes and in the "source" listed under each table and figure. Information used ranges from local jurisdictional existing plans, studies, and policies, to state and federal information, and to non-agency studies, plans and resources; all of which helped to inform the Steering Committee and provide a basis for decisions made during the NHMP update process.

For example, linking existing plans and policies to the *2021 Umatilla County NHMP* helps identify what resources already exist that can be used to implement the mitigation actions in the NHMP. 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 as well as the Cities and Special Districts. In addition to the plans listed in Tables 4-1 and B-20, the County and Cities also have zoning ordinances (including floodplain development regulations) and building regulations. Identifying and finding the wide range of plans, studies, policies, agreements and the like is important.

The above provides a short description of how information in the NHMP was incorporated into the NHMP. The following descriptions of each section in the NHMP also provides details on the changes that have been made during the update process. Besides updating the NHMP with an extensive amount of new and more current information, the goals for the DLCD Natural Hazards Planner and the Umatilla County NHMP Steering Committee were to make the NHMP more user friendly and less repetitive.

Cover and Front Pages

The cover and the front pages orient the reader of the NHMP to what the NHMP contains.

- A new NHMP cover was created. The photos for the cover were taken by Umatilla County, Cities, and Special Districts staff. Photos were also added to the Volume I, II, and III covers.
- The FEMA Approval Pending Adoption (APA) and final approval letter as well as the County, Cities, and Special Districts resolutions of adoption are included (when available).
- The Acknowledgements have been updated to include the 2021 Umatilla County NHMP Steering Committee members.

The Table of Contents has been updated.

Volume I: Basic Plan

Executive Summary

The executive summary provides an overview of the FEMA requirements plans process and highlights the key elements of the risk assessment, mitigation strategy and implementation and maintenance strategy.

Section 1: Introduction

The Introduction briefly describes the countywide mitigation planning efforts and the methodology used to develop the plan.

Section 2: Risk Assessment

Section 2 provides the factual basis for the mitigation strategies contained in Section 3. Additional information is included within Appendix B, Community Profile, which contains an overall description of Umatilla County and the Cities as well as Special Districts.

The Risk Assessment section includes a brief description of community sensitivities and vulnerabilities and an overview of the natural hazards further addressed in Volume II Hazard Annexes. Climate change is discussed in the Risk Assessment, the Hazard Annexes, and Appendix E.

The Risk Assessment allows readers to gain an understanding of Umatilla County's, and other jurisdictions', sensitivities – those community assets and characteristics that may be impacted by natural hazards, as well as the County's, and other jurisdictions', resilience – the ability to manage risk and adapt to hazard event impacts. Information on the jurisdictions' participation in the National Flood Insurance Program (NFIP) is included, with additional details in the Flood Annex.

Section 3: Mitigation Strategy

This section documents the plan vision, mission, goals, and actions and describes the components that guide implementation of the identified mitigation strategies. Mitigation actions are based on community sensitivity and resilience factors and the hazard assessments in Section 2 Risk Assessment and Volume II Hazard Annexes. In Section 3, there are two tables related to mitigation actions: Table 3-1 Umatilla County 2021 NHMP Mitigation Actions and Table 3-2 Umatilla County Mitigation Actions 2014 Status.

Section 4: Plan Implementation and Maintenance

This section provides information on the implementation and maintenance of the plan. It describes the process for prioritizing projects, and includes a suggested list of tasks for updating the plan to be completed at the semi-annual and five-year review meetings. There is a five-year update cycle for the NHMP. As part of this NHMP process, the NHMP will be reviewed and discussed twice per year at plan maintenance meetings. This will help ensure the NHMP is used and stays connected to the plans, policies, and programs of the involved jurisdictions and other Steering Committee members. The Emergency Management Performance Grant (EMPG) requires NHMP review twice per year.

Volume II: Hazard Annexes

The hazard annexes describe the risk assessment process and summarize the best available local hazard data. A hazard summary is provided for each of the hazards addressed in the plan. The summary includes hazard history, location, extent, vulnerability, impacts, and probability.

The hazard specific annexes included with this NHMP are the following:

- Floods;
- Air Quality;
- Severe Summer Storms;
- Severe Winter Storms (combined with Severe Summer Storms);
- Wildfire;
- Drought
- Earthquakes;
- Volcanoes, and
- Landslides/Debris Flows.

Volume III: Mitigation Resources

The resource appendices are designed to provide the users of the *2021 Umatilla County Natural Hazards Mitigation Plan* with additional information to assist them in understanding the contents of the mitigation plan, and provide them with potential resources to assist with plan implementation.

Appendix A: Planning and Public Process

This appendix includes documentation of all the countywide public processes utilized to update the plan. It includes invitation lists, meeting agendas, sign-in sheets, screen shots from websites, and copies of flyers, as well as any other public involvement methods.

Appendix B: Community Profile

The community profile describes the Umatilla County, Cities, Special Districts, and others from a number of perspectives to help define and understand the regions sensitivity and resilience to natural hazards. The information in this section represents a snapshot in time of the current sensitivity and resilience factors in the region when the plan was updated. Sensitivity factors can be defined as those community assets and characteristics that may be impacted by natural hazards, (e.g., special populations, economic factors, and historic and cultural resources). Community resilience factors can be defined as the community's ability to manage risk and adapt to hazard event impacts (e.g., governmental structure, agency missions and directives, and plans, policies, and programs). This appendix has been greatly updated from the *2014 Umatilla County NHMP*.

Appendix C: Economic Analysis of Natural Hazard Mitigation Projects

This appendix describes FEMA's requirements for benefit/cost analysis in natural hazards mitigation, and two other approaches: the cost effectiveness and the STAPLE/E. This appendix has been retained and modified from *2014 Umatilla County NHMP*.

Appendix D: Grant Programs and Resources

This appendix lists state and federal resources and programs by hazard. It has been greatly updated from the *2014 Umatilla County NHMP*.

Appendix E: Future Climate Projections Reports

This appendix includes one report and one informational flyer provided by the Oregon Climate Change Research Institute (OCCRI): *Future Climate Projections Umatilla County: A Report to the Oregon Land Conservation and Development* and the U*matilla County Future Projections Two-Pager*. The report is dated October 2020 and the flyer was done in January 2021. These documents were funded by DLCD using a small portion of the HMGP 3244 grant funds obtained by DLCD. This is a new appendix.

Appendix F: Umatilla County NHMP Hazards Maps Details

A large majority of the maps located in the *2021 Umatilla County NHMP* were created by Umatilla County Land Use Planning. There are a total of 30 maps covering natural hazards, utilities, cropland and more. A handful of maps were created through open-source online mapping programs. Many datasets used to create this map were either generated by Umatilla County or were obtained by Umatilla County from other agencies. This is a new appendix.

Appendix G: Umatilla County NHMP Success Stories

These are stories that illustrate when a community in Umatilla County identifies a problem or concern and then works to solve it. These stories were identified and provided by the members of the Umatilla County NHMP Steering Committee. This is a new appendix.

Appendix H: Umatilla County Natural Hazards Outreach Calendar

This calendar will be used each year to focus outreach and education efforts on natural hazards on a month by month basis. It relates to short-term multi-hazard mitigation action #2 in the *2021 Umatilla County NHMP*. See Table 3-1, 2021 Umatilla County NHMP Mitigation Actions for the mitigation actions. This is a new appendix.

Appendix I: Umatilla County Community Wildfire Protection Plans

To reduce the impact of wildfire, Umatilla County has three Community Wildfire Protection Plans (CWPP): the *West County CWPP* (2006), the *Blue Mountains and Foothills Region CWPP* (2005), and the *Mill Creek and Walla Walla County CWPP* (2017).

The CWPPs provide detailed information on the vulnerability and history of wildfire in the County, and provide mitigation actions the County can implement to reduce the impact of wildfire. This *2021 Umatilla County NHMP* links to the CWPPs as it also contains wildfire information and mitigation actions. See Table 3-1, Umatilla County NHMP Mitigation Actions.

2021 NHMP Update

Umatilla County, the Cities, and the Special Districts are dedicated to directly involving the public in the review and update of the NHMP. Although members of the NHMP Steering Committee represent the public to some extent, the residents of Umatilla County, the Cities, and the Special Districts are also given the opportunity to provide feedback about the NHMP. As described in in Section 4 Plan Implementation and Maintenance, the NHMP will undergo review twice per year.

Umatilla County, the Cities, and the Special Districts made information about the *2021 Umatilla County NHMP* available via their websites and other places. For example, the Umatilla County NHMP Flyer (shown below) was posted on the website and distributed widely. The final copy of the NHMP will be posted on the websites.

For this *2021 Umatilla County NHMP*, the NHMP Steering Committee members are listed below. Umatilla County, the twelve incorporated cities, and four special districts are identified as partners that are plan holders* because they have signed IGAs with DLCD. The state –DLCD and OEM - and federal – FEMA - agencies are not plan holders but are lead partners engaged in this collaboration.

Project Managers:

Tricia Sears, Natural Hazards Planner, DLCD
Robert Waldher, Planning Director, Umatilla County

Lead Partners and Partners that are Plan Holders* Include:

Umatilla County*
Adams*
Athena*
Echo*
Helix*
Hermiston*
Milton-Freewater*
Pendleton*
Pilot Rock*
Stanfield*
Ukiah*
Umatilla*
Weston*
Hermiston Irrigation District*
Stanfield Irrigation District*
Umatilla County Soil and Water Conservation District*
Walla Walla River Irrigation District*
Oregon Office of Emergency Management (OEM)
Oregon Department of Land Conservation and Development (DLCD)
Federal Emergency Management Agency (FEMA) Region X

All Participants / Partners on the NHMP Steering Committee

Representatives from the following organizations served as steering committee members for the Umatilla County Natural Hazards Mitigation Plan update process. Partners that are plan holders are those organizations or jurisdictions that signed IGAs with DLCD for the work on the NHMP. These plan holders are: Umatilla County, Adams, Athena, Echo, Helix, Hermiston, Milton-Freewater, Pendleton, Pilot Rock, Stanfield, Ukiah, Umatilla, Weston, Hermiston Irrigation District, Stanfield Irrigation District, Umatilla County Soil and Water Conservation District, and the Walla Walla River Irrigation District. All participants on the NHMP Steering Committee are listed below.

Department of Land Conservation & Development Staff

Tricia Sears, Natural Hazards Planner, DLCD

Umatilla County

Bob Waldher	Planning Director, Convenor
Megan Green	Planner II/GIS
Tierney Cimmiyotti	Planning Admin
Tom Roberts	Emergency Manager, Convenor
Gina Miller	Smoke Management
Dan Dorran	Commissioner
John Shafer	Commissioner

Adams

Graham Alderson	City Councilor

Athena

Michelle Fox	City Recorder

Echo

Dave Slaght	City Administrator

Helix

Josh Smith	Public Works
Kim Herron	Mayor

Hermiston

Clinton Spencer	City Planner

Milton-Freewater

Shane Garner	Fire Chief

Pendleton

George Cress	City Planner
Bob Patterson	Public Works Director
Greg Lacquement	Regulatory Specialist, Public Works

Pilot Rock

Teri Bacus	City Recorder

Stanfield

Benjamin Burgener	City Manager

Ukiah

Donna Neumann	City Recorder

Umatilla

Brandon Seitz	Community Development Director
Jacob Foutz	Associate Planner
Darla Huxel	Police Chief
Keith Kennedy	Police Lieutenant

Weston

Duane Thul	Mayor

Hermiston Irrigation District

Annette Kirkpatrick	District Manager

Stanfield Irrigation District

Ray Kopacz	District Manager
Tiffany Harrell	Office Manager

Umatilla County Soil and Conservation District

Kyle Waggoner	District Manager

Walla Walla River Irrigation District

Teresa Kilmer	District Manager

National Weather Service/ NOAA

Vincent Papol	Senior Meteorologist
Marcus Austin	Warning Coordination Meteorologist

Confederated Tributes of the Umatilla Indian Reservation

Patty Perry	Senior Planner
Rob Burnside	Public Safety Director
Caleb Minthorn	Air Quality Technician

Greater Eastern Oregon Development Corporation

Susan Christensen	Executive Director
Bree Cubrilovic	RARE AmeriCorps

Clearview Disability Resource Center

Darrin Umbarger	Chief Executive Officer

US Army Corps of Engineers –Walla Walla & Portland Distr.

Jim Gonzalez	Emergency Operations
Linda Campbell	Emergency Readiness Chief
Michelle Frost	Catastrophic Disaster Response Manager

Oregon Energy Trust

Caryn Appler	Eastern Oregon Outreach Manager
Jeni Hall	Program Manager – Advanced Solar

Other Participants

Brad Humbert	Milton-Freewater Water Control District
Scott Stanton	Umatilla County Fire District #1
Dave Baty	East Umatilla Fire & Rescue District
Matt Hoehna	Oregon Department of Forestry
Brett Thomas	USDA – Umatilla National Forest
Troy Baker	Walla Walla Basin Watershed Council
Terry Rowan	Umatilla County Sheriff's Office
Jim Littlefield	Umatilla County Sheriff's Office
LG Bullock	Umatilla County Public Works
Anne Debbaut	DLCD, Regional Representative
Meghan Dalton	Oregon Climate Change Research Institute (OCCRI)
Amie Bashant	OEM, State Hazard Mitigation Officer

Participation levels for the partners on the Umatilla County NHMP Steering Committee were high throughout the process of updating the NHMP. It should be noted that this entire NHMP update was accomplished during the Covid-19 pandemic. All Steering Committee meetings were virtual. For the DLCD Natural Hazards Planner, Tricia Sears, this was a very different approach to doing the NHMP update as typically Steering Committee meetings are conducted in person.

The Covid-19 pandemic forced most all jurisdictions not only locally, but globally, to use internet based technologies to conduct meetings. Many places in Umatilla County, such as the City of Ukiah and area around Ukiah are almost completely dark to many of these capabilities (internet and cellular). In addition, the overall leadership capacity of the City of Ukiah and other jurisdictions has limitations for participation in many activities due to their very small size. Some of the people participating on the Umatilla County NHMP Steering Committee are in volunteer positions. Most participants wear many hats, so to speak, for their respective jurisdictions.

In addition, addressing multiple disasters at once, with a pandemic, floods, and wildfires, most jurisdictions have found themselves operating in overwhelming and truly extraordinary times. Umatilla County staff provided a substantial amount of assistance to all of the partners participating in the NHMP update. In addition, Umatilla County's Planning Director, Emergency Manager, and Board of County Commissioners have extensively traveled throughout the County to see impacted

areas, share information, and provide assistance. For example, they have attended many meetings such as city council meetings, special district meetings, and meetings with OEM and FEMA. Umatilla County NHMP Steering Committee members also shared information with each other and to folks within their communities. For example, Graham Alderson of the City of Adams noted he conveyed information from the NHMP update process with other Adams City Council members and staff. Other Umatilla County NHMP Steering Committee members stated their similar approaches. So regardless of meeting attendance, NHMP update information was being shared.

The following pages include Table A-2 Umatilla County NHMP Important Dates and copies of meeting agendas and sign-in sheets from NHMP Steering Committee meetings, website screenshots, flyers, and other information that demonstrates the outreach that has been done during this NHMP update process.

Summary of Outreach

Table A-2 Umatilla County NHMP Important Dates

Date	Description of Event/Activity
February 2020	DLCD staff: Celinda Adair, Marian Lahav, Tamra Mabbott, and Tricia Sears engage in dialogue with Tom Roberts and Bob Waldher of Umatilla County regarding the flooding situations in Umatilla County.
February 20, 2020	Pre-award NHMP meeting held by the Umatilla County Emergency Manager. This meeting was held in Pendleton, OR.
February 26, 2020	Tom Roberts submits the Letter of Intent for HMGP funding under DR-4432 to Amie Bashant, State of Oregon Hazard Mitigation Officer (SHMO) at the Oregon Office of Emergency Management (OEM). The funding would be to update the *2014 Umatilla County NHMP* which expired in 2019.
February 27, 2020	State Recovery Planning Committee (SRPC) meeting. Tricia Sears and Matt Crall from DLCD attended.
February 27, 2020	The State, Federal, and Local Agency Coordination Meeting Re: Umatilla Flooding is held, hosted by Courtney Crowell of the Regional Solutions Office of Governor Brown. DLCD staff in attendance: Tricia Sears, Celinda Adair, and Tamra Mabbott.
February – April 2020	Tricia worked extensively with Bob Waldher and Tom Roberts at Umatilla County to prepare the Letter of Intent for HMGP application and the HMGP application for the Umatilla County NHMP update.
March 30, 2020	DLCD staff Celinda Adair and Matt Crall provide a memo to John Turner and Rob Corbett of Pendleton regarding the “City of Pendleton Manufactured Home Park Flood Recovery Considerations and Options.”
April 3, 2020	FEMA approves the major disaster declaration DR-4519 for the severe storms, flooding, landslides, and mudslides that occurred February 5-9,

	2020 in Umatilla County. Individual Assistance (IA) was approved for Umatilla County and the Confederated Tribes of the Umatilla Indian Reservation. Public Assistance (PA) was approved for Umatilla, Wallowa, and Union Counties, and the Confederated Tribes of the Umatilla Indian Reservation. Hazard Mitigation was approved statewide.
April 30, 2020	By this date, Tricia Sears sends the draft IGA, SOW, project schedule, cost share forms, and three draft Steering Committee meeting agendas for review to Bob Waldher and Tom Roberts at Umatilla County.
April 30, 2020	By this date, Umatilla County sends the draft Steering Committee roster and IGA contracts to Tricia Sears.
May 1, 2020	Tricia submits the HMPG application to the SHMO at OEM for funding to update the *2014 Umatilla County NHMP*.
May 29, 2020	Tricia provides additional information to the SHMO at OEM for the HMGP application to update the *2014 Umatilla County NHMP*.
May - September	Dialogue continues on the HMGP application and pre-award work. Extensive outreach and work is accomplished with Umatilla County, the cities, and the special districts. All twelve incorporated cities in Umatilla County and four special districts sign IGA/SOWs with DLCD for the Umatilla County NHMP update: Umatilla County, Adams, Athena, Echo, Helix, Hermiston, Milton-Freewater, Pendleton, Pilot Rock, Stanfield, Ukiah, Umatilla, Weston, Stanfield Irrigation District, Hermiston Irrigation District, Walla Walla River Irrigation District, and Umatilla County Soil and Water Conservation District.
June 2020	The Umatilla County NHMP Flyer is finalized and distributed.
June 23, 2020	Tricia provides additional information to the SHMO at OEM for the HMGP application to update the *2014 Umatilla County NHMP*.
August 19, 2020	The East Oregonian publishes an article about the Umatilla County NHMP update; Bob Waldher is interviewed for it.
August 21, 2020	Tricia provides additional information to the SHMO at OEM for the HMGP application to update the *2014 Umatilla County NHMP*.
August 31, 2020	FEMA sends letter to Andrew Phelps, the Director of OEM, stating that FEMA has approved the HMPG funds for DR-4432 for the Umatilla County NHMP update. The letter states the funds were obligated on August 24, 2020. The period of performance for the grant is May 2, 2019 to July 31, 2023.

September 2, 2020	Tricia provides fully executed IGA/SOW between DLCD and Umatilla County to Umatilla County.
September 3, 2020	The Umatilla County Rivers and Creeks Workgroup meeting is held, hosted by Courtney Crowell of the Regional Solutions Office of Governor Brown. Staff from DLCD in attendance: Tricia Sears, Celinda Adair, Amanda Punton, and Tamra Mabbott. Bob Waldher and John Shafer from Umatilla County attend.
September 2020	Tricia, Bob, Tom, Megan, and Tierney work on preparing meeting materials and other logistics for the first meeting of the Umatilla County NHMP Steering Committee.
September 23, 2020	Umatilla County's IT Department sets up the NHMP webpage on the Umatilla County website.
September 23, 2020	Tricia sends via email the Umatilla County NHMP Steering Committee the materials for the September 29, 2020 meeting.
September 29, 2020	The first meeting of the Umatilla County NHMP Steering Committee is held by Zoom. Tricia facilitates the meeting. Agenda items included a background on why we are here and what the NHMP update process entails, review of the project schedule and establishment of Steering Committee meeting dates, the Hazard Vulnerability Assessment, cost share forms and tracking, and a preview of upcoming topics. We discussed public outreach noting the already created Umatilla County NHMP Flyer and the NHMP page on the Umatilla County website. We also agreed to make decisions by consensus with acknowledgements of comments.
October 7, 2020	Graham Alderson of Adams emails Tricia and says they sent the Umatilla County NHMP Flyer out with the October newsletter, the *Adams American*. The newsletter includes a statement about the NHMP work.
October 7, 2020	Bob Waldher sends several NHMP Steering Committee meeting documents to the Umatilla County IT Department to post on the website.
October 7, 2020	Tricia sends the NHMP Steering Committee the notes from the September 29, 2020 meeting, the Hazard Vulnerability Analysis (HVA) Summary, and the updated NHMP Steering Committee roster.
October 8, 2020	Tricia sends the updated project schedule to the NHMP Steering Committee.
October 8, 2020	Michelle Fox of Athena emails Tricia with the screen shot of the Athena website with the Umatilla County NHMP flyer posted.
October 9, 2020	Graham Alderson of Adams provides the City Council with information about the HVA Summary.

October 15, 2020	Tierney Cimmiyotti of Umatilla County and Tricia set up a cost share form tracking sheet on Google docs. This sheet will be updated throughout the NHMP update process.
October 15, 2020	Tricia sent the draft Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List to the Umatilla County NHMP Steering Committee.
October 26, 2020	Tricia sends via email the Umatilla County NHMP Steering Committee the materials for the October 27, 2020 meeting.
October 27, 2020	The second meeting of the Umatilla County NHMP Steering Committee is held by Zoom. Tricia facilitates the meeting. Agenda items include: a reminder about cost share; the OCCRI *Future Climate Projections* report research (Meghan Dalton from OCCRRI presented information); draft Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List; and further discussion of the HVA which resulted in the addition of air quality as a natural hazard.
October 28, 2020	Donna Grimes of Adams emails Tricia a copy of the October newsletter, the *Adams American*, which includes a statement about the NHMP work.
October 30, 2020	Tricia sends the NHMP Steering Committee the notes from the October 27, 2020 meeting; the revised Hazard Vulnerability Analysis Summary; the updated NHMP Steering Committee roster; and the updated draft Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List.
November 10, 2020	Tricia sends via email the Umatilla County NHMP Steering Committee the materials for the November 17, 2020 meeting. This included an updated draft of the Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List.
November 12, 2020	Tricia sends the memo to Scott Van Hoff of FEMA Region X requesting information on the RL and SRL for Umatilla County et al. She emails a copy of the email to Bob and Tom.
November 12, 2020	At the October 27, 2020 meeting, the NHMP Steering Committee agreed to provide to Tricia their jurisdictional information for the draft Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List. Tricia agreed to integrate the information and send the revised list out prior to the November 17th meeting.
November 13, 2020	Tricia sends the NHMP Steering Committee the updated draft Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List.
November 17, 2020	The third Umatilla County NHMP Steering Committee meeting is held by Zoom. Tricia facilitates the meeting. Agenda items include discussion of status of existing mitigation actions from the *2014 Umatilla County NHMP*

	and whether the actions will be retained as is, retained and modified, or deleted, and crafting new mitigation actions. The mission statement and the goals from the *2014 Umatilla County NHMP* are also discussed as to whether those will be retained as is or modified.
November – December 2020	Working through the mitigation actions to reach the point of having all mitigation actions ready for the NHMP.
November 20, 2020	Tricia sends the NHMP Steering Committee the notes from the November 17, 2020 meeting; the updated roster; the updated Mitigation Actions Status Review, and the updated Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List.
December 8, 2020	Tricia sends via email the Umatilla County NHMP Steering Committee the materials for the December 15, 2020 meeting. This included the agenda, the updated roster, the updated Mitigation Actions Status Review, and the updated Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List.
December 15, 2020	The fourth Umatilla County NHMP Steering Committee meeting is by Zoom. Discussion focused on: maps for the NHMP that are being prepared by Umatilla County; the review and revision of the mission and goals; the status of existing mitigation actions from the *2014 Umatilla County NHMP* and whether the actions will be retained as is, retained and modified, or deleted, and crafting new mitigation actions; and adding an additional Steering Committee meeting to the schedule. A reminder was noted about the cost share forms, current roster, and the continued need to receive information for the in progress Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List.
December 16, 2020	Tricia sends the NHMP Steering Committee the notes from the December 15, 2020 meeting; the updated roster; the updated project schedule; and the updated Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List.
Throughout the NHMP work	Tricia works with each NHMP Steering Committee member to obtain their fully completed cost share forms and supporting documentation to be used as match in the grant funds that DLCD has (HMGP) to support this NHMP update.
January 6, 2021	Tricia takes screen shots of the City of Hermiston's website information about the Umatilla County NHMP update.
January 13, 2021	Tricia emailed the NHMP Steering Committee with: google links to the maps and photos for the NHMP; the two-pager info sheet about future climate projections; the Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List; the special showing of *The Last House Standing*; and the cost share forms.

January 14, 2021	Tricia emailed the jurisdictions that have missing or incomplete information on the Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List. Asked for their information to be provided by 1/29/21.
January 19, 2021	Tricia sends via email the Umatilla County NHMP Steering Committee the materials for the January 26, 2021 meeting: the agenda; the updated NHMP Steering Committee roster; the updated Mitigation Actions Review Status; and the Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List
January 26, 2021	The fifth Umatilla County NHMP Steering Committee meeting is held by Zoom. The focus of discussion is: the process of review and approval of the NHMP, the upcoming availability of the draft NHMP for review by the Steering Committee, the need for photos of natural hazards, the maps that are available for review, the mitigation actions, and the Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List.
January 28, 2021	Tricia sends the NHMP Steering Committee the notes from the January 26, 2021 meeting, along with the updated NHMP Steering Committee roster, the updated Mitigation Actions Review Status, and the Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List.
February 1, 2021	Tricia emails the folks at Pilot Rock, Helix, Stanfield, Hermiston, and Weston to ask again for their information to include in the Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List.
February 1, 2021	Bob Waldher emails the NHMP Steering Committee to ask as “last call” for mitigation actions.
February 3, 2021	Tricia meets with Bob and Megan of Umatilla County to discuss the NHMP update work and the draft *2021 Umatilla County NHMP*.
February 9, 2021	Megan Green sends Tricia the screenshot of the draft *2021 Umatilla County NHMP* as posted on the Umatilla County Planning Department website.
February 10, 2021	Tricia sends a draft of the *2021 Umatilla County NHMP* to the Steering Committee. It is a partial draft as the entire NHMP is not yet written. She asks for comments to be sent to her by February 23, 2021 and for the NHMP to be posted to the jurisdictional websites.

February 17, 2021	Tricia sends via email the Umatilla County NHMP Steering Committee the materials for the February 23, 2021 meeting. This includes: the meeting agenda, the updated NHMP Steering Committee roster, the Table of Contents with Comments from the 2/10/21 draft Umatilla County NHMP, the Critical/Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List, the Mitigation Actions Status Review, the Mitigation Actions for the 2021 Umatilla County NHMP, and the Energy Trust of Oregon One-Pager.
February 18, 2021	Tricia sends the revised OCCRI *Future Climate Projections: Umatilla County* report to the NHMP Steering Committee. Because of an issue with the pdf file, Tricia sends the report again on February 23, 2021.
February 18, 2021	Pendleton's Air Quality Commission meets. Greg Lacquement of Pendleton facilitates the meeting. Tricia Sears attends.
February 23, 2021	The sixth Umatilla County NHMP Steering Committee meeting is held by Zoom. The focus of discussion is: comments on the draft *2021 Umatilla County NHMP*, mitigation actions, and a presentation from Energy Trust of Oregon.
February 25, 2021	Tricia sends the Umatilla County NHMP Steering Committee the notes from the February 23, 2021 meeting and also sends the revised NHMP Steering Committee roster, the revised 2021 Mitigation Actions for the 2021 Umatilla County NHMP, and the two Energy Trust of Oregon PowerPoint presentations in PDF.
February 26, 2021	Umatilla County – CTUIR Flood Recovery and Hazard Mitigation Meeting is held, hosted by Joseph Murray at OEM. Tom Roberts of Umatilla County and Tricia Sears and Celinda Adair of DLCD attend.
February 2021	Umatilla County Commissioner Dan Dorran attended the meeting of and provided Umatilla County NHMP information to the City Council of the City of Ukiah.
February – March 2021	Comments received and revisions made to the draft *2021 Umatilla County NHMP*.
March 18, 2021	Umatilla County – CTUIR Flood Recovery and Hazard Mitigation Meeting is held, hosted by Joseph Murray at OEM. Tom Roberts of Umatilla County and Tricia Sears and Celinda Adair of DLCD attend.
March 18, 2021	Tricia sends the draft *2021 Umatilla County NHMP* to the NHMP Steering Committee for review, with comments due on 3/30/21.
March 31, 2021	Tricia submits the *2021 Umatilla County NHMP* to Oregon Emergency Management (OEM) and to the Federal Emergency Management Agency (FEMA) for review. They agree to review the NHMP concurrently.

March 31, 2021	Tricia sends the invitation to the Umatilla County NHMP Steering Committee for the special April 6, 2021 meeting with OEM about current HMGP funding opportunities. The invitation includes an agenda.
April 6, 2021	Tricia facilitates the Umatilla County NHMP Steering Committee meeting with OEM about HMPG funding opportunities. OEM staff at the meeting include Anna Feigum, Joseph Murry, and Stephen Richardson.
April 6, 2021	Tricia sends the meeting notes, the OEM PowerPoint presentation, and the HMGP pre-application/letter of intent form to the Umatilla County NHMP Steering Committee and guests Anna Feigum, Joseph Murry, and Stephen Richardson.
April 15, 2021	Umatilla County – CTUIR Flood Recovery and Hazard Mitigation Meeting is held, hosted by Joseph Murray at OEM. Tom Roberts and Bob Waldher of Umatilla County and Tricia Sears and Celinda Adair of DLCD attended.
April 26, 2021	Joseph Murray of OEM emails Tricia with comments and suggestions for the *2021 Umatilla County NHMP*. Joseph states these are suggestions and does not require these changes be made. FEMA confirms they are doing a concurrent review of the NHMP but does not yet have comments.
April 27, 2021	Tricia emails the Umatilla County NHMP Steering Committee the information about a free NOAA workshop on risk communication and a contest/grant opportunity from Smart Growth America.
May 7, 2021	Tricia emails the Umatilla County NHMP Steering Committee the information about the HMGP-DR-4562-OR funds that remain available ($24 million); a pre-application is due July 1, 2021.
May 11, 2021	Tricia sends via email the Umatilla County NHMP Steering Committee the materials for the May 18, 2021 meeting. This includes the agenda.
May 11, 2021	Tricia receives the FEMA comments on the draft *2021 Umatilla County NHMP* from Edgar Gomez of FEMA. She shares these comments with Bob Waldher and Tom Roberts of Umatilla County.
May 18, 2021	The eighth Umatilla County NHMP Steering Committee meeting is held by Zoom. The focus of discussion is to check about our progress on the review by OEM and FEMA of the *2021 Umatilla County NHMP*. The Steering Committee discussed the FEMA comments and the timeline for the next steps of the NHMP review and approval process.
May 18, 2021	Tricia sends via email the Umatilla County NHMP Steering Committee the draft language for the NHMP about participation. She requested comments be made to her by 9 am on 5/21/21. She also sent examples of resolutions for NHMP approval for county and city jurisdictions.
May 19, 2021	Tricia sends via email the Umatilla County NHMP Steering Committee the meeting notes from the May 18, 2021. She also reminds them that she needs their cost share forms.

May 19, 2019	Umatilla County – CTUIR Flood Recovery and Hazard Mitigation Meeting is held, hosted by Joseph Murray at OEM. Tom Roberts and Bob Waldher of Umatilla County and Tricia Sears and Celinda Adair of DLCD attended.
May 25, 2021	A revised *2021 Umatilla County NHMP* is submitted to FEMA. The revised NHMP addresses the comments FEMA provided in the FEMA Local NHMP Review Tool in an email on 5/11/21 to DLCD and discussed in a phone call on 5/11/21. A revised Local NHMP Review Tool is also submitted.
June 7, 2021	The *2021 Umatilla County NHMP* receives the Approved Pending Adoption (APA) letter from FEMA. The letter is emailed from Joseph Murray at OEM to Tricia, Bob, and Tom.
June 16, 2021	The *2021 Umatilla County NHMP* is approved by Umatilla County Board of County Commissioners on 6/16/21.
June-August, 2021	The jurisdictional (plan holder) approval dates: Umatilla County 6/16/21 Adams 6/14/21 Athena 6/10/21 Echo 6/15/21 Helix 6/21/21 Hermiston 7/12/21 Milton-Freewater 7/12/21 Pendleton 6/15/21 Pilot Rock 8/3/21 Stanfield 7/20/21 Ukiah 7/6/21 Umatilla 7/6/21 Weston 6/9/21 Stanfield Irrigation District 7/14/21 Hermiston Irrigation District 6/10/21 Walla Walla River Irrigation District 7/8/21 Umatilla County Soil and Water Conservation District 6/15/21
August 4, 2021	The resolutions of approval from Umatilla County et al (see list) are sent to OEM and FEMA.
August 19, 2021	Joseph Murray at OEM emails Tricia, Bob, and Tom the *2021 Umatilla County NHMP* approval letter, dated 8/17/21, from FEMA. The dates of approval for the NHMP are from August 12, 2021 to August 11, 2026.

Source: Tricia Sears, DLCD, August 2021.

Meetings Related to the Umatilla County NHMP

State Recovery Planning Committee (SRPC) Meeting Agenda

Meeting Date & Time: Thursday, February 27, 2020 3:00 to 5:00 p.m.

Call-In Number: 1-866-590-5055, participant code: 751480

1) **Roll Call and Introductions**
Clint Fella, Chair, OMD-OEM

2) **Review of current status: We will review the preliminary data we are in the process of collecting for our damage assessments for both Individual Assistance and Public Assistance/Infrastructure.**
Joseph Murray, SDRC, OMD-OEM

3) **Discuss any other damages/impacts and associated grants related to our state recovery apparatus, such as SBA.**
Clint, facilitating

4) **Review the outcome of the Governor Brown's Regional Solutions "State, Federal and local Agency Coordination Meeting re: Umatilla Flooding"**
Joseph, facilitating

5) **SRF updates and status from Coordinating agencies, including the Coordinating agencies work with their Primary and Supporting agencies.**
Clint, facilitating

SRF 1: DLCD, Community Planning and Capacity Building for Disaster Recovery
SRF 2: Business Oregon, Economic Recovery
SRF 3: OHA, Health Services
SRF 4: Oregon DHS, Social Services
SRF 5: OHCS, Disaster Housing
SRF 6: DAS, ODOE, ODOT, PUC, Infrastructure Systems
SRF 7: DEQ, Natural and Cultural Resources

6) **Other business – open discussion**
Joseph, facilitating

7) **Adjourn**
Clint, Chair

The next meeting is currently scheduled for Thursday, March 26, 2020, but likely will occur sooner.

State, Federal and local Agency Coordination Meeting re: Umatilla Flooding

Thursday, February 27, 2020
10 am
Umatilla County Sheriff's office,
Conference Room,
4700 N W Pioneer Place
Pendleton, OR 97801

Agenda

-Welcome and introductions

-Federal Disaster Declaration process- Andrew Phelps, Director, Office of Emergency Management
 -State Recovery Functions
 -Economic Recovery Council

-Legislative proposal – Courtney Crowell, Regional Solutions Coordinator, Office of the Governor

-Overview of CTUIR needs- Chuck Sams

-Overview of County needs – George Murdock

-Overview of City of Pendleton needs- John Turner/Robb Corbett

-Overview of Milton-Freewater needs- Linda Hall

-Housing discussion- Paula Hall, CAPECO and Oregon Housing and Community Services
 -How can state, federal and local agencies work together on finding solutions

-Infrastructure needs discussion- Umatilla County
 - How can state, federal and local agencies work together on both short term and long term solutions

-Other discussion topics

-Next Steps

-Wrap up and adjourn

Tricia missed some of the introductions of people, Tamra there in person, Celinda & on phone

Andrew, there has to be certain # homes impacted, looks like 100-150 with damage

- major damage
- individual asst comes faster than public asst
- indiv. asst disaster last ones 1996 & Vernonia floods. $33,000 is typical amount for asst, $8000 paid out to people
- Primary homes are focus for indiv. asst
- need more communication for info distrib to everyone, like a resource doc, that could be an action item
- they will have a public asst disaster too

Joseph - sounds good
? KJ

- remember to track hours
- benefits to those that have wells? Joseph does not know but maybe Small biz assoc can provide grants
- USDA rural grants may be an option
- KJ says wells can be counted as minor damage as part of home infrastructure

- letter to gov by March 5, public asst for 3 counties, indiv for Umatilla only, econ. development recovery
- 3 pieces of policy decis - Gov off, Gov disaster cabinet, Joseph is the State disaster recovery coordinator for this one, he will be coord the groups for that, 1st time they have done a disaster recovery coord,
- disaster footprint

- mitigation actions, e.g. culvert example on a road,
- Celinda noted keep the floodord & floodpl mngr in the loop
- note envir & other permits are required

- they made a commitment to rebuild the levee, need jobs, thank you to Gov for $, maybe put liens on property,

- March 2016 econ recovery council estab.
- timing, things the people do,

- focusing on levee issues big issue,
- Tom, what about spring coming up, concerns
- guy from USACE about levee, need to file for assistance to office appropriate,

more

From Courtney 9/2/20

REGIONAL SOLUTIONS OFFICE
GOVERNOR KATE BROWN

Umatilla County Rivers and Creeks Workgroup

Thursday, September 3, 2020
10:30 am-12:00 pm
Zoom

Meeting Agenda

I. Welcome and introductions ✓

II. Recap of February flooding in Umatilla County ✓

III. Overview of projects in need of state/federal help and collaboration
   a. MURC
   b. Weston
   c. Others?

IV. Resource discussion

V. Next steps

VI. Adjourn

Notes

John Shafer, April 2019 flood w/ Mikah Creek, got table, 2020 permits for work on 2019, but then they flooded again in Feb 2020, had the largest air rescue of 54 people, dogs, cat, rabbit, water was 20,000 CFS, they cleaned debris from river, they had flood in May 2020,

note – look @ full basin study

Rob Corbett, he says every year the creek is cleaned/maintained, stream was protected for fish so less able to clear the creek of debris, looking @ hiring a consultant to do full basin of Mikah Creek study. Levee blew out in Pendleton, biggest flood in 100 yrs w/ a foot of overtopping levee,

Gary, thank you Rob for looking @ entire basin,

Courtney, the Pres Dis Dec ~~[illegible]~~ had IA & PA in 2020 flood,

John – $48 mill damage to county roads & bridges

Kathleen – $1.7 million indiv asst, $1.3 mill small biz, from Feds to Umatilla Co

→ more notes

Air Quality Commission Agenda
CITY OF PENDLETON
February 18th, 2021
Virtual

1. CALL TO ORDER
   a. Introduction of Guests:
      Tricia Sears
      Oregon Department of Land Conservation and Development
      Planning Services Division

2. APPROVAL OF THE MINUTES
   a. Accept the minutes of the 21 January 2021 meeting.

3. OLD BUSINESS
   a. Burn Forecast: Update
   b. Woodstove Replacement Loan Program / Woodsmoke Reduction Grant program: Update
   c. Air Education: Update
   d. LEPC- Wildfire Exercise: Update

4. NEW BUSINESS
   a. Umatilla County- Natural Hazard Mitigation Plan

5. OTHER BUSINESS
   a. DEQ (Tom Hack/Peter Brewer)
   b. CTUIR (Caleb Minthorn):
      CTUIR Smoke Managers Virtual Meeting
   c. National Weather Service (Mary Wister):
   d. Umatilla County Smoke Management (Gina Miller):

6. NEXT MEETING
   a. March 16, 2021- LEPC Wildfire Exercise
   b. April 15th, 2021- Regular AQC meeting; 3:00pm / Location: TBD

7. ADJOURNMENT

If special accommodations for hearing, visual, or manual impairment are needed to allow an individual to participate, or if in interpreter is needed, please contact the City's administrative office at 541-966-0201 at least 48 hours in advance of the meeting.

Umatilla County-CTUIR Flood Recovery and Hazard Mitigation Meeting
Agenda

Meeting Date & Time: Friday, February 26, 2021, 3:30 to 4:30 p.m. PST

Meeting Location: https://global.gotomeeting.com/join/901646797
[We're going to use the VOIP audio that comes with the GoToMeeting software; if it's not working well, OEM has a phone conference bridge reserved just in case.]

[I will try to keep us to the time allocations below even if it means tabling a discussion and coming back to it at the next meeting or a separate meeting. Joseph]

1) [5 minutes] Introductions (Joseph will use webinar log-ins to help facilitate introductions.)
Joseph Murray, OMD-OEM, facilitating

2) [5 minutes] Purpose of Meeting[1]
Joseph

3) [15 minutes] Levee challenges and opportunities
Daryl Downing or Joseph, facilitating

   A. What are the benefits of mapping private levees in Umatilla County (including Tribal lands)? If the benefits are substantial, which organization is resourced and best suited to do this mapping?

   B. Is there any public funding for the repair of private levees? Is there possible interest in forming new local special districts with responsibility for these levees? [2] If so, could they then go into the USACE program?

   C. What benefits accrue to whom in *not* repairing certain private levees?

   D. What homes/businesses protected by these levees may be interested in acquisition or elevation in lieu of levee repairs? Which local and/or Tribal governments might step-up to be a sponsor for these kinds of projects?

   E. Which levees with public sponsors still need repairs? What work still needs to be done to restore levees in Milton-Freewater (and nearby areas)?[3]

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[1] **The purpose of this meeting is to determine and discuss long-term recovery and hazard mitigation needs, issues, challenges, opportunities, and potential resources, projects, and actions in Umatilla County and with the CTUIR related to the flooding that occurred during 2019 and 2020.** (On February 12, 2020 OEM Director Phelps asked Joseph to be the State Disaster Recovery Coordinator (SDRC) for this flood event. Joseph is also the State Coordinating Officer (SCO) for the April 2019 flood event. In these roles, among Joseph's priorities are to assist local and voluntary agency officials to identify resources that might be applied to implementing recovery and hazard mitigation.)
[2] A public sponsor must be a government entity with taxing and condemnation authority; PNPs cannot serve as sponsors.
[3] Both of these topics may be better suited to be addressed during the periodic meetings that USACE is hosting. These interagency levee task force meetings have been named the "Interagency Recovery Task Force" (IRTF). The next meeting of the IRTF will probably occur near the end of March.

4) [5 minutes] Locations of damaged homes and businesses? (Is better information needed on these locations and – if so – what information can be provided without violating privacy regulations?)
Joseph, facilitating

5) [10 minutes] What needs to be done to mitigate flooding risk to the remaining mobile homes and also RVs that are in Colony Park (name?) in the City of Pendleton? Colony Park - ? was formerly known as Riverside Mobile Home Park.
Robb Corbett or Joseph

6) [10 minutes] Hazard mitigation funding opportunities
Anna Feigum or Joseph

   A. There is Hazard Mitigation Grant Program (HMGP) funding available via FEMA-4562-DR-OR and HMGP-PF-FM-5327, **millions of dollars…**
   B. What additional outreach-publicity ought to be done in Umatilla County and with CTUIR?
   C. What sorts of project opportunities are known, but thus far – not pursued?
   D. What local government entities could step-up to become public sponsors for mitigation projects in the Milton-Freewater *area*, including HMGP projects?

7) [5 minutes] Other business
Joseph, facilitating

   A. Snowpack in the flood-affected watersheds?
   B. How are things going along Mill Creek in Northeast Umatilla County?

8) [5 minutes] Develop agenda items for next meeting(s)
Joseph, facilitating

   A. How soon/how often do we want/need to meet?
   B. Possibility of separate meetings with Echo, Milton-Freewater, and Weston
   C. Long-term recovery needs assessment
   D. Flood mitigation for City of Echo and nearby areas
   E. Current and future recovery/mitigation needs along McKay Creek
   F. Summary of flood studies in Umatilla County that are underway or proposed
   G. What else?

9) Adjourn

Umatilla County-CTUIR Flood Recovery and Hazard Mitigation Meeting
Agenda

Meeting Date & Time: Thursday, March 18, 2021, 11:00 a.m. to Noon PDT

Meeting Location: https://global.gotomeeting.com/join/721103925
[We're going to use the VOIP audio that comes with the GoToMeeting software; if it's not working well, OEM has a phone conference bridge reserved just in case.]

[I will try to keep us to the time allocations below even if it means tabling a discussion and coming back to it at the next meeting or a separate meeting. Joseph]

1) [5 minutes] Introductions (Joseph will use webinar log-ins to help facilitate introductions.)
Joseph Murray, OMD-OEM, facilitating

2) [15 minutes] Hazard mitigation projects:
Joseph or Anna Feigum, facilitating

As of March 15, there was approximately $25 million available for hazard mitigation funding from FEMA-4562-DR-OR with a July 1 pre-application deadline. Among the *potentially eligible and cost-effective* projects could be elevation, relocation, or acquisition of homes and businesses, flood-proofing, watershed and streambank treatments/improvements to slow runoff or erosion, education and outreach, warning systems, etc.

A. Outreach – to whom and how?

B. Possible projects – currently proposed and potential

3) [10 minutes] Levee challenges and opportunities
Joseph, facilitating, with Paul Sclafani or designee

A. Mapping of levees

Rivers in Umatilla County with existing levees include Mill Creek, Umatilla, North Fork Walla Walla, South Fork Walla Walla, and _____ (what else?)

[Still looking for the correct spelling of the Chaplish - ? and Wanik – sp? Springs levees near the Thorn Hollow Bridge.]

Paul will talk about how we might go about mapping levees.

B. Identification of governmental entities which might sponsor an existing private levee or sponsor a new levee

4) [5 minutes] Update on maps of flooded homes and businesses
Joseph, Tom Roberts, and/or Karen Layng

5) [15 minutes] Other business
Joseph, facilitating

A. What are the current and future recovery and mitigation needs along McKay Creek? (that are not already in the works)

B. Update of the Umatilla County MJ-NHMP (It is anticipated that a review draft will come to OEM near the end of March. If all goes well, a FEMA re-approved MJ-NHMP for Umatilla County and its partners is possible sometime in late May or early June.)

C. How are things going along Mill Creek in Northeast Umatilla County?

D. What is your #1 long-term recovery need?

E. What do you view as the hazard mitigation project that would do the most good?

6) [10 minutes] Develop agenda items for next meeting(s)
Joseph, facilitating

A. How soon/how often do we want/need to meet?

B. Planning Town Halls

C. Separate meetings with Echo, Milton-Freewater, and Weston

D. Long-term recovery needs assessment

E. Summary of flood studies in Umatilla County that are underway or proposed

F. What else?

7) Adjourn

Umatilla County-CTUIR Flood Hazard Mitigation and Recovery Meeting
Agenda

Meeting Date & Time: Thursday, April 15, 2021, 1:00 to 2:00 p.m. PDT

Meeting Location: https://global.gotomeeting.com/join/672712565
[We're going to use the VOIP audio that comes with the GoToMeeting software; if it's not working well, OEM has a phone conference bridge reserved just in case.]

1) [5 minutes] Introductions (Joseph will use webinar log-ins to help facilitate introductions.)
Joseph Murray, OMD-OEM, facilitating

2) [15 minutes] CTUIR, local gov., CAPECO, BMRLTR – top two hazard mitigation or recovery needs:
Joseph, facilitating

   A. City of Pendleton: 1. Increasing the security of homes from seasonal flooding, 2. repairing damage/erosion to McKay Creek, and 3. floodplain mapping

3) [15 minutes] Discuss new "tasks, committees, and people" tracking file
Joseph, facilitating

4) [5 minutes] Update on the Umatilla County MJ-NHMP
Tricia, DLCD

5) [10 minutes] Other business
Joseph, facilitating

   A. Separate meeting to work on the levee mapping project

   B. Separate meetings with Echo, Milton-Freewater, Weston, and Mill Creek neighborhood **[The meetings with Echo are already occurring with leadership by Courtney and others.]**

   C. How are things going along Mill Creek in Northeast Umatilla County?

   D. How soon/how often do we want/need to meet? Do you want these meetings to run longer? (90 minutes? 2 hours?)

   E. Other

6) [10 minutes] Develop agenda items for next meeting(s)
Joseph, facilitating

   A. Town Hall planning

   B. Summary of flood studies in Umatilla County that are underway or proposed

   C. What else?

7) Adjourn

Umatilla County-CTUIR Flood Hazard Mitigation and Recovery Meeting
Revised Agenda

Meeting Date & Time: Wednesday, May 19, 2021, 10:30 a.m. to NLT Noon PDT

Meeting Location: https://global.gotomeeting.com/join/310551941
[We're going to use the VOIP audio that comes with the GoToMeeting software; if it's not working well, OEM has a phone conference bridge reserved just in case. When you land on the GoToMeeting website, it will look like this meeting begins 30 minutes earlier than the time on this agenda. This is so people can log-on early and in case we need any pre-meeting discussions.]

1) [5 minutes] Introductions (Joseph will use webinar log-ins to help facilitate introductions.)
Joseph Murray, OMD-OEM, facilitating

2) [15 minutes] Discuss BMRLTRG need for clear guidance on private levees and similar structures
Joseph, facilitating

   A. Written/clearly outlined steps involved in permitting for a private levee

   B. Any official or legal repercussions for homeowners should they construct a flood protection system without pulling permits

   C. General information to disperse among families affected by flooding about the risks of constructing individual embankments to the surrounding areas and community

3) [15 minutes – see tasks 06 and 09 on table] Discuss intended goal(s) and objectives (what we hope to accomplish) for proposed levee mapping project[1]
Joseph, facilitating

   A. Determine who wants/needs to be involved in a separate meeting to work on the levee mapping project

   B. Determine potential sponsor(s) to repair and maintain levees found to be serving as important flood protection, and which local officials ought to approach these entities; sponsor candidates may be Umatilla County,[2] CTUIR, the SWCD, and newly formed special purpose levee/water control districts.

4) [15 minutes – see tasks 08 and 10 on table] Education & Outreach – Town Hall Planning – Possible HMGP Application(s)
Joseph, facilitating

5) [5 minutes] Update on the Umatilla County MJ-NHMP
Tricia, DLCD

[1] Eight buildings have been proposed by CTUIR for acquisition; these may be among those that had been protected by private levees.
[2] Counties seem to seldom serve as levee sponsors; there may be a legal reason for this.

6) [10 minutes] Other business
Joseph, facilitating

A. How are things going along Mill Creek in Northeast Umatilla County?

B. Other

7) [10 minutes] **Next steps**
Joseph, facilitating

8) [10 minutes] Develop agenda items for next meeting(s)
Joseph, facilitating

9) Adjourn

Steering Committee Meeting Agendas and Sign-in Sheets

UMATILLA COUNTY SHERIFF'S OFFICE

"Conservators of the Peace"

Sheriff Terry L. Rowan Undersheriff Jim Littlefield

See notes on the sheet w/ zoom link

Emergency Management Division Thomas Roberts, Emergency Manager

UMATILLA COUNTY

Natural Hazards Mitigation Plan Update

Umatilla County Justice Center Media Room
4700 NW Pioneer Place, Pendleton, OR 97801
February 20, 2020, 12:30-2:00 pm
Zoom Meeting Information:

Pre-award phase of project SS

MEETING AGENDA

1. Welcome, Introductions
2. Overview of Existing NHMP
   a. 2009 Plan
   b. 2014 Update (Expired June 2019)
   c. Cities included in NHMP
3. Funding Opportunities to Help Complete Update
   a. Hazard Mitigation Grant Program (HMGP)
      i. DR-4432, $390,769 (Due 03/01/20)
      ii. DR-4452, $118,795 (Due 04/01/20)
4. Resources to Complete Update
   a. DLCD Assistance
      i. Letter of Interest Required
      ii. Expected Completion Time?
      iii. Can Cities be Included as Addenda?
      iv. Special Districts?
      v. Discuss Match Requirements
   b. RARE Intern

4700 NW Pioneer Pl.
Pendleton, OR 97801
www.co.umatilla.or.us/sheriff

Phone 541-966-3600
Fax 541-278-5496

UMATILLA COUNTY

Natural Hazards Mitigation Plan Update

Umatilla County Justice Center Media Room
4700 NW Pioneer Place, Pendleton, OR 97801
February 20, 2020, 12:30-2:00 pm

Attendees

Name	Agency	Email
Bob Waldher	Umatilla County Planning	robert.waldher@umatillacounty.net
Tamra Mabbott	DLCD – Regional Representative	tamra.mabbott@state.or.us
Tom Roberts	Umatilla County Emergency Management	thomas.roberts@umatillacounty.net
Shane Garner	City of Milton-Freewater	shane.garner@milton-freewater-or.gov
Vincent Papol	NOAA/NWS	vincent.papol@noaa.gov
George Cress	City of Pendleton	george.cress@ci.pendleton.or.us
Michelle Frost	USACE Walla Walla District	michelle.d.frost@usace.army.mil
Marc Austin	National Weather Service	marcus.austin@noaa.gov
Brian Wolcott	Walla Walla Basin Watershed Council	Brian.wolcott@wwbwc.org

Via Phone/Video

Name	Agency	Email
Marian Lahav	DLCD – Natural Hazards Program	marian.lahav@state.or.us
Tricia Sears	DLCD – Natural Hazards Program	tricia.sears@state.or.us
Amie Bashant	Oregon Emergency Management	amie.bashant@mil.state.or.us
Kyle Waggoner	Umatilla County SWCD	umcoswcd@eotnet.net

UMATILLA COUNTY
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Umatilla County NHMP Update
Steering Committee Meeting
Tuesday September 29, 2020 from 1-3 pm

Join Zoom Meeting
https://us02web.zoom.us/j/81622050169?pwd=bWd3eFJNYlljNmsrYXJWRTZlVmk2UT09

AGENDA

I. Welcome & Introductions & Sign-In (15 min) Tom Roberts, Bob Waldher, Megan Green, Tierney Cimmyiyotti, and Tricia Sears

II. NHMP Update Project (25 min) Tricia and Tierney
- What is the Natural Hazards Mitigation Plan (NHMP)? (NHMP Info Sheet)
- Cost Share (Cost Share Forms and Instructions)
- Roles and Responsibilities, Intergovernmental Agreement/ Scope of Work
- Planning Process and Schedule (Project Schedule)
- Public Outreach (Website: http://www.umatillacounty.net/NHMP/, Umatilla County NHMP Flyer)

III. Steering Committee (10 min) Tom, Bob, and Tricia
- Composition of the Committee (SC Roster)
- Ground Rules and Decisions - Vote or Consensus with Acknowledgements

IV. Hazard Vulnerability Analysis (HVA) (60 min) Tricia
- Work Session (Significant Hazard Events, HVA Worksheet)

V. Overview of Upcoming Discussions (5 min) Tricia
- Mission and Goals from 2014 NHMP (on back of agenda)
- Mitigation Actions from 2014 NHMP
- Critical Infrastructure, Critical Facilities, and Lifelines from 2014 NHMP
- Oregon Climate Change Research Institute (OCCRI) Report

VI. Next Steps (5 min) Tricia
- Next Meeting, October 26? That would be the 4th Tuesday in October
- Meeting Notes and Follow up

Materials
From Umatilla County: Copies of 2014 NHMP
From DLCD: Meeting Agenda; NHMP Info Sheet; Cost Share Form (3); Project Schedule; Umatilla County NHMP Flyer; SC Roster; Significant Hazard Events; and HVA Worksheet

2020-2021 Umatilla County NHMP Steering Committee Meetings and Meeting Topics

The update of the NHMP will involve at least three post-award in-person or virtual meetings, led by the DLCD Natural Hazards Planner. On the 9/22/20 Project Schedule, there are five meetings identified.

These post-award NHMP Steering Committee meetings will focus on:

- Performing a Hazard Vulnerability Analysis/Assessment (HVA);
- Identifying the critical infrastructure, critical facilities, and lifelines (and the hazards that may impact them);
- Identifying the changing future conditions (climate change impacts are included);
- Reviewing the mission and goals of the NHMP and revising as applicable;
- Discussing and completing cost share information and documentation;
- Identifying success stories of the communities;
- Reviewing and identifying significant historic hazard events;
- Public outreach activities (websites, flyers, events); and
- Reviewing the status of the existing mitigation actions in the *2014 Umatilla County NHMP* and determining if those are completed or need to be retained as is or revised, and to add new actions.

Umatilla County NHMP, May 2014

The *2014 Umatilla County NHMP* has the mission and goals in Chapter 1.

Mission: *To prevent loss and protect life, property, and the environment from the risk of natural hazards through coordination and cooperation amount public and private partners.*

The plan goals describe the overall direction that the participating jurisdiction's agencies, organizations, and citizens can take toward mitigating risk from natural hazards.

Goal #1: *Protect life and property.*

Goal #2: *Public outreach.*

Goal #3: *Planned prevention.*

Goal #4: *Agency/citizen coordination.*

Goal #5: *Natural resource protection.*

Goal #6: *Emergency service planning.*

Mitigation Actions and Timeline

The *2014 Umatilla County NHMP* has mitigation actions in Chapter 2. Mitigation actions include both short and long-term activities. Each action item includes an estimate of the timeline for implementation and indicates a capacity to achieve the mitigation action.

Short-term action items (ST) are activities that may be implemented with existing resources and authorities in one to two years.

Long-term action items (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement.

Ongoing action items are activities that are currently being performed and will continue into the foreseeable future.

Umatilla County NHMP Update

Steering Committee Meeting Attendance

Tuesday, September 29, 2020

1:00 – 3:00 pm via Zoom

Roll call attendance taken by Tierney Cimmiyotti, Umatilla County

NAME	ORGANIZATION	ATTENDANCE
PROJECT MANAGEMENT TEAM		
Tom Roberts	County Emergency Management	Y
Bob Waldher	County Planning Department	Y
Megan Green	County Planning Department	Y
Tricia Sears	Oregon DLCD	Y
CITY REPRESENTATIVES		
George Cress	Pendleton	Y
Shane Garner	Milton-Freewater	Y
Clinton Spencer	Hermiston	Y
Michelle Fox	Athena	Y
Duane Thul	Weston	Y
Sheila Jasperson	Weston	Y
Donna Neumann	Ukiah	N
David Slaght	Echo	Y
Benjamin Burgener	Stanfield	Y
Brandon Seitz	Umatilla	Y
Darla Huxel	Umatilla	Y
Keith Kennedy	Umatilla	Y
Graham Alderson	Adams	Y
Kristen Schmitgall	Adams	N
Donna Grimes	Adams	N
Carrie Bennett	Helix	N
Josh Smith	Helix	Y
Kim Herron	Helix	N
Teri Bacus	Pilot Rock	N
SPECIAL DISTRICT REPRESENTATIVES		
Teresa Kilmer	Walla Walla River Irrigation District	Y
Brad Humbert	M-F Water Control District	N
Ray Kopacz	Stanfield Irrigation District	Y
Kyle Waggoner	UCSWCD - Soil & Water Conservation District	Y
Annette Kirkpatrick	Hermiston Irrigation District	Y
Scott Stanton	Umatilla County Fire District #1	N
Dave Baty	East Umatilla Rural Fire Protection District	N
Rachelle Lasater	East Umatilla Rural Fire Protection District	Y

EXTERNAL PARTICIPANTS, TECHNICAL OR LEGAL ADVISORS		
Marcus Austin	National Weather Service - Pendleton	N
Vincent Papol	NWS - Pendleton - Local Emergency Planning Committee	Y
Greg Lacquement	City of Pendleton - Local Emergency Planning Committee	N
Brett Thomas	USDA- Umatilla National Forest - Fire	N
Matt Hoehna	Oregon Department of Forestry - Fire	N
Darrin Umbarger	Clearview Disability Resource Center	N
Patty Perry	Confederated Tribes of the Umatilla Indian Reservation	Y
John Shafer	Umatilla County Board of Commissioners	Y
Brian Wolcott	Walla Walla Basin Watershed Council	N
Troy Baker	Walla Walla Basin Watershed Council	Y
Jim Gonzalez	US Army Corps of Engineers - Portland District	N
Linda Campbell	US Army Corps of Engineers - Walla Walla District	N
Michelle Frost	US Army Corps of Engineers - Walla Walla District	Y
Susan Christensen	Greater Eastern Oregon Development Corporation	Y
Bree Cubrilovic	Greater Eastern Oregon Development Corporation	Y
Terry Rowan	Umatilla County Sheriff's Office	N
Jim Littlefield	Umatilla County Sheriff's Office	N
Anne Debbaut	Oregon DLCD	Y

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Umatilla County NHMP Update
Steering Committee Meeting
Tuesday October 27, 2020 from 1-2:30 pm

Join Zoom Meeting
https://us02web.zoom.us/j/89394033673?pwd=bXFNU0VZYThjUnhRUExEQmoyRytsQT09

AGENDA

I. Welcome & Introductions & Sign-In (10 min) Tom Roberts, Bob Waldher, Megan Green, Tierney Cimmyiyotti, and Tricia Sears

II. NHMP Update (10 min) Tricia et al
- Cost share check in: questions, concerns
- Updated roster (10-26-20) and project schedule (9-29-20) sent with meeting materials
- Steering Committee members updates on outreach activities e.g. websites, flyer distribution
- Tom's update re: recovery mitigation liaison

III. Changing Future Conditions (20 min) Tricia and Meghan Dalton
Meghan Dalton from Oregon Climate Change Research Institute (OCCRI) regarding the *Umatilla County Future Projections Report*
https://drive.google.com/drive/folders/1htmQtDq0N414BbcvC8WF6aG72yh8VLmT?usp=sharing

IV. Hazard Vulnerability Analysis (HVA) (15 min) Tricia et al
- Review and discuss HVA Summary, add air quality and calculate risk score (HVA Summary)

V. Critical Facilities, Critical Infrastructure, &Vulnerable Population Centers (30 min) Tricia et al
- Review and update *2014 Umatilla County NHMP* critical facilities list (Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List)

VI. Next Steps (5 min) Tricia
- Next Meeting is November 17: focus on mitigation actions
- Meeting notes and follow up

Materials
From Umatilla County: Copies of *2014 Umatilla County NHMP*
From DLCD: Meeting Agenda; Umatilla County NHMP Steering Committee Roster 10-26-20; Project Schedule; HVA Summary; Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List 10-15-20; Lists also from Hermiston and Milton-Freewater

2020-2021 Umatilla County NHMP Steering Committee Meetings and Meeting Topics

The update of the NHMP will involve at least three post-award in-person or virtual meetings, led by the DLCD Natural Hazards Planner. On the 9/22/20 Project Schedule, there are five meetings identified.

These post-award NHMP Steering Committee meetings will focus on:

- Performing a Hazard Vulnerability Analysis/Assessment (HVA);
- Identifying the critical infrastructure, critical facilities, and lifelines (and the hazards that may impact them);
- Identifying the changing future conditions (climate change impacts are included);
- Reviewing the mission and goals of the NHMP and revising as applicable;
- Discussing and completing cost share information and documentation;
- Identifying success stories of the communities;
- Reviewing and identifying significant historic hazard events;
- Public outreach activities (websites, flyers, events); and
- Reviewing the status of the existing mitigation actions in the *2014 Umatilla County NHMP* and determining if those are completed or need to be retained as is or revised, and to add new actions.

Umatilla County NHMP, May 2014

The *2014 Umatilla County NHMP* has the mission and goals in Chapter 1.

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Goal #4: *Agency/citizen coordination.*

Goal #5: *Natural resource protection.*

Goal #6: *Emergency service planning.*

Mitigation Actions and Timeline

The *2014 Umatilla County NHMP* has mitigation actions in Chapter 2. Mitigation actions include both short and long-term activities. Each action item includes an estimate of the timeline for implementation and indicates a capacity to achieve the mitigation action.

Short-term action items (ST) are activities that may be implemented with existing resources and authorities in one to two years.

Long-term action items (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement.

Ongoing action items are activities that are currently being performed and will continue into the foreseeable future.

Umatilla County NHMP Update

Steering Committee Meeting Attendance

Tuesday, October 27, 2020

1:00 – 2:30 pm via Zoom

Roll call attendance taken by Tierney Cimmiyotti, Umatilla County

October 27, 2020 — Roll call taken by Tierney Cimmiyotti of Umatilla County at the 10/27/20 Umatilla County NHMP Steering Committee meeting held on Zoom.

NAME	ORGANIZATION	ATTENDANCE
PROJECT MANAGEMENT TEAM		
Tom Roberts	County Emergency Management	N
Bob Waldher	County Planning Department	Y
Megan Green	County Planning Department	Y
Tierney Cimmiyotti	County Planning Department	Y
Tricia Sears	Oregon DLCD	Y
Marian Lahav	Oregon DLCD	N
CITY REPRESENTATIVES		
George Cress	Pendleton	Y
Shane Garner	Milton-Freewater	Y
Clinton Spencer	Hermiston	Y
Michelle Fox	Athena	N
Duane Thul	Weston	N
Sheila Jasperson	Weston	N
Donna Neumann	Ukiah	N
David Slaght	Echo	N
Justin Northern	Echo	Y
Benjamin Burgener	Stanfield	N
Brandon Seitz	Umatilla	N
Darla Huxel	Umatilla	N
Keith Kennedy	Umatilla	Y
Graham Alderson	Adams	Y
Krissen Schmitgall	Adams	N
Dorma Grimes	Adams	N
Carrie Bennett	Helix	N
Josh Smith	Helix	Y
Kim Herron	Helix	N
Terl Bacus	Pilot Rock	Y
SPECIAL DISTRICT REPRESENTATIVES		
Teresa Kilmer	Walla Walla River Irrigation District	Y
Brad Humbert	M-F Water Control District	N
Ray Kopecz	Stanfield Irrigation District	Y
Kyle Waggoner	UCSWCD - Soil & Water Conservation District	N
Annette Kirkpatrick	Hermiston Irrigation District	Y
Scott Stanton	Umatilla County Fire District #1	Y
Dave Baty	East Umatilla Rural Fire Protection District	N
Rathelle Lasater	East Umatilla Rural Fire Protection District	N
EXTERNAL PARTICIPANTS, TECHNICAL OR LEGAL ADVISORS		
Marques Austin	National Weather Service - Pendleton	Y
Vincent Papol	NWS - Pendleton - Local Emergency Planning Committee	Y
Greg Lacquement	City of Pendleton - Local Emergency Planning Committee	N
Bob Patterson	City of Pendleton - Local Emergency Planning Committee	N
Brett Thomas	USDA - Umatilla National Forest - Fire	N
Matt Hoelms	Oregon Department of Forestry - Fire	N
Darrin Umbinger	Clearview Disability Resource Center	N
Patty Perry	Confederated Tribes of the Umatilla Indian Reservation (CTUIR)	Y
Rob Burnside	Confederated Tribes of the Umatilla Indian Reservation (CTUIR) - Public Safety Director	Y
John Shafer	Umatilla County Board of Commissioners	Y
Brian Wolcott	Walla Walla Basin Watershed Council	N
Troy Baker	Walla Walla Basin Watershed Council	N
Jim Gonzalez	US Army Corps of Engineers - Portland District	N
Linda Campbell	US Army Corps of Engineers - Walla Walla District	N
Michelle Frost	US Army Corps of Engineers - Walla Walla District	N
Susan Christensen	Greater Eastern Oregon Development Corporation	N
Bree Dibrillovic	Greater Eastern Oregon Development Corporation	Y
Terry Rowen	Umatilla County Sheriff's Office	N
Jim Littlefield	Umatilla County Sheriff's Office	N
Anne Debbaut	Oregon DLCD	N
Meghan Dalton	Oregon Climate Change Research Institute (OCCRI)	Y

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Umatilla County NHMP Update
Steering Committee Meeting
Tuesday November 17, 2020 from 1-2:30 pm

Join Zoom Meeting
https://us02web.zoom.us/j/88041035717?pwd=dTJsWmNWR1dhTTYzYW94Nk5mckhTZz09

AGENDA

I. Welcome & Introductions & Sign-In (10 min) Tom Roberts, Bob Waldher, Megan Green, Tierney Cimmyiyotti, and Tricia Sears

II. NHMP Update (10 min) Tricia et al
- Updated roster (Umatilla County NHMP Steering Committee Roster 11-3-20)
- Updated Critical Facilities List (Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List)
- Cost share and outreach activities e.g. websites, flyer distribution
- Other?

III. Mission and Goals (15 min) Tricia, Bob, Tom
- Mission and the six goals from *2014 Umatilla County NHMP* (on back of agenda)
- Retain as is or modify them?

IV. Mitigation Actions (50 min) Tricia et al
- Review *2014 Umatilla County NHMP* mitigation actions, identify status, determine if those actions need to be retained as is, retained and modified, or deleted, also add new mitigation actions (Mitigation Actions Status Review)
- Definitions of Mitigation Actions Timelines (on back of agenda)

V. Next Steps (5 min) Tricia
- Next Meeting is December 15: Continue discussion on mitigation actions
- Meeting notes and follow up

Materials
From Umatilla County: Copies of 2014 NHMP
From DLCD: Meeting Agenda; Umatilla County NHMP Steering Committee Roster 11-3-20; Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List; Mitigation Actions Status Review

2020-2021 Umatilla County NHMP Steering Committee Meetings and Meeting Topics

The update of the NHMP will involve at least three post-award in-person or virtual meetings, led by the DLCD Natural Hazards Planner. On the 9/22/20 Project Schedule, there are five meetings identified.

These post-award NHMP Steering Committee meetings will focus on:

- Performing a Hazard Vulnerability Analysis/Assessment (HVA);
- Identifying the critical infrastructure, critical facilities, and lifelines (and the hazards that may impact them);
- Identifying the changing future conditions (climate change impacts are included);
- Reviewing the mission and goals of the NHMP and revising as applicable;
- Discussing and completing cost share information and documentation;
- Identifying success stories of the communities;
- Reviewing and identifying significant historic hazard events;
- Public outreach activities (websites, flyers, events); and
- Reviewing the status of the existing mitigation actions in the *2014 Umatilla County NHMP* and determining if those are completed or need to be retained as is or revised, and to add new actions.

Umatilla County NHMP, May 2014

The *2014 Umatilla County NHMP* has the mission and goals in Chapter 1.

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Goal #5: *Natural resource protection.*

Goal #6: *Emergency service planning.*

Mitigation Actions and Timeline

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Ongoing action items are activities that are currently being performed and will continue into the foreseeable future.

Umatilla County NHMP Update

Steering Committee Meeting Attendance

Tuesday, November 17, 2020

1:00 – 2:30 pm via Zoom

Roll call attendance taken by Tierney Cimmiyotti, Umatilla County

NAME	ORGANIZATION	ATTENDANCE
PROJECT MANAGEMENT TEAM		
Tom Roberts	County Emergency Management	N
Bob Waldher	County Planning Department	Y
Megan Green	County Planning Department	Y
Tricia Sears	Oregon DLCD	Y
CITY REPRESENTATIVES		
George Cress	Pendleton	Y
Julie Chase	Pendleton	Y
Shane Garner	Milton-Freewater	Y
Clinton Spencer	Hermiston	Y
Michelle Fox	Athena	Y
Duane Thul	Weston	N
Sheila Jasperson	Weston	N
Donna Neumann	Ukiah	N
David Slaght	Echo	Y
Justin Northern	Echo	N
Benjamin Burgener	Stanfield	N
Brandon Seitz	Umatilla	Y
Darla Huxel	Umatilla	Y
Keith Kennedy	Umatilla	Y
Graham Alderson	Adams	Y
Carrie Bennett	Helix	N
Josh Smith	Helix	Y
Kim Herron	Helix	N
Teri Bacus	Pilot Rock	Y
SPECIAL DISTRICT REPRESENTATIVES		
Teresa Kilmer	Walla Walla River Irrigation District	Y
Brad Humbert	Milton-Freewater Water Control District	N
Ray Kopacz	Stanfield Irrigation District	Y
Kyle Waggoner	UCSWCD - Soil & Water Conservation District	Y
Annette Kirkpatrick	Hermiston Irrigation District	Y
Scott Stanton	Umatilla County Fire District #1	N
Dave Baty	East Umatilla Fire & Rescue District	N
Rachelle Lasater	East Umatilla Fire & Rescue District	N

EXTERNAL PARTICIPANTS, TECHNICAL OR LEGAL ADVISORS		
Marcus Austin	National Weather Service - Pendleton	Y
Vincent Papol	NWS - Pendleton - Local Emergency Planning Committee	N
Greg Lacquement	City of Pendleton - Local Emergency Planning Committee	Y
Bob Patterson	City of Pendleton – Strategic Planning	N
Brett Thomas	USDA- Umatilla National Forest - Fire	N
Matt Hoehna	Oregon Department of Forestry - Fire	Y
Darrin Umbarger	Clearview Disability Resource Center	Y
Patty Perry	Confederated Tribes of the Umatilla Indian Reservation	Y
Rob Burnside	Confederated Tribes of the Umatilla Indian Reservation	N
John Shafer	Umatilla County Board of Commissioners	N
Brian Wolcott	Walla Walla Basin Watershed Council	RETIRED -N
Troy Baker	Walla Walla Basin Watershed Council	N
Jim Gonzalez	US Army Corps of Engineers - Portland District	N
Linda Campbell	US Army Corps of Engineers - Walla Walla District	N
Michelle Frost	US Army Corps of Engineers - Walla Walla District	Y
Susan Christensen	Greater Eastern Oregon Development Corporation	N
Bree Cubrilovic	Greater Eastern Oregon Development Corporation	N
Terry Rowan	Umatilla County Sheriff's Office	N
Jim Littlefield	Umatilla County Sheriff's Office	N
LG Bullock	Umatilla County Public Works	N
Anne Debbaut	Oregon DLCD	N

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Umatilla County NHMP Update
Steering Committee Meeting
Tuesday December 15, 2020 from 1-2:30 pm

Join Zoom Meeting
https://us02web.zoom.us/j/85431667202?pwd=MTJtMzBOME1CbGQ4ZlZnRlIIZnFuUT09

AGENDA

I. Welcome & Introductions & Sign-In (10 min) Tom Roberts, Bob Waldher, Megan Green, Tierney Cimmiyotti, and Tricia Sears

II. NHMP Update (5 min) Tricia et al
- Updated roster (Umatilla County NHMP Steering Committee Roster 11-19-20)
- Updated Critical Facilities List (Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List 12-2-20)

III. NHMP maps created by Megan (20 min) Megan
- New map format: Population Density
  - Floods: Floodplain, Floodplain Central
  - Wildfire: Fire History, Wildfire Burn Areas, Wildfire Burn Probability, Wildfire Smoke Sensitive Areas

IV. Mission and Goals (15 min) Tricia, Bob, Tom
- Mission and the six goals from *2014 Umatilla County NHMP* (on back of agenda)
- Retain as is or modify them?

V. Mitigation Actions (35 min) Tricia et al
- Review *2014 Umatilla County NHMP* mitigation actions, identify status, determine if those actions need to be retained as is, retained and modified, or deleted, also add new mitigation actions (Mitigation Actions Status Review)
- Definitions of Mitigation Actions Timelines (on back of agenda)

VI. Next Steps (5 min) Tricia
- Next Meeting is January 26, 2021
- Meeting notes and follow up

Materials
From Umatilla County: Copies of 2014 NHMP
From DLCD: Meeting Agenda; Umatilla County NHMP Steering Committee Roster 11-19-20; Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List 12-2-20; NHMP Maps: Population Density, Floodplain, Floodplain Central, Fire History, Wildfire Burn Areas, Wildfire Burn Probability, Wildfire Smoke Sensitive Areas; Mitigation Actions Status Review 11-25-20

Umatilla County NHMP, May 2014
The *2014 Umatilla County NHMP* has the mission and goals in Chapter 1.

Existing Mission: *To prevent loss and protect life, property, and the environment from the risk of natural hazards through coordination and cooperation amount public and private partners.*

Proposed Changes to the Mission:

To prevent loss and protect life, property, and the environment from the risk of natural hazards through coordination and cooperation among public and private partners. To improve and increase mitigation and resilience throughout Umatilla County.

To prevent loss and protect life, property, and the environment from the risk of natural hazards through coordination and cooperation among public and private partners. To strive for mitigation and resilience in our efforts to protect our assets, including the public's needs following a disaster.

To prevent loss and protect life, property, and the environment from ~~the risk of~~ natural hazards through coordination and cooperation among public and private partners. To mitigate the impacts of natural hazards and to increase the resilience of our community in our efforts to protect life, property, and the environment.

Mitigation: the action of reducing the severity, seriousness, or painfulness of something.

Resilience: the capacity to recover quickly from difficulties; toughness.

Yellow highlight indicates proposed new language to add to the mission.

The plan goals describe the overall direction that the participating jurisdiction's agencies, organizations, and citizens can take toward mitigating risk from natural hazards.

Goal #1: *Protect life and property.*

Goal #2: *Public outreach.*

Goal #3: *Planned prevention.*

Goal #4: *Agency/citizen coordination.*

Goal #5: *Natural resource protection.*

Goal #6: *Emergency service planning.*

Mitigation Actions and Timeline

The *2014 Umatilla County NHMP* has mitigation actions in Chapter 2. Mitigation actions include both short and long-term activities. Each action item includes an estimate of the timeline for implementation and indicates a capacity to achieve the mitigation action.

Short-term action items (ST) are activities that may be implemented with existing resources and authorities in one to two years.

Long-term action items (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement.

Ongoing action items are activities that are currently being performed and will continue into the foreseeable future.

December 15, 2020	Roll call taken by Tierney Cimmiyotti of Umatilla County at the 12/15/20 Umatilla County NHMP Steering Committee meeting held on Zoom.	
NAME	ORGANIZATION	ATTENDANCE
PROJECT MANAGEMENT TEAM		
Tom Roberts	County Emergency Management	Y
Bob Waldher	County Planning Department	Y
Megan Green	County Planning Department	Y
Tierney Cimmiyotti	County Planning Department	Y
Tricia Sears	Oregon DLCD	Y
Marian Lahav	Oregon DLCD	N
CITY REPRESENTATIVES		
George Cress	Pendleton	Y
Shane Garner	Milton-Freewater	N
Clinton Spencer	Hermiston	Y
Michelle Fox	Athena	Y
Duane Thul	Weston	N
Sheila Jasperson	Weston	Y
Donna Neumann	Ukiah	N
David Slaght	Echo	Y
Justin Northern	Echo	N
Benjamin Burgener	Stanfield	N
Brandon Seitz	Umatilla	Y
Darla Huxel	Umatilla	N
Keith Kennedy	Umatilla	N
Graham Alderson	Adams	Y
Carrie Bennett	Helix	N
Josh Smith	Helix	N
Kim Herron	Helix	N
Teri Bacus	Pilot Rock	Y
SPECIAL DISTRICT REPRESENTATIVES		
Teresa Kilmer	Walla Walla River Irrigation District	Y
Brad Humbert	M-F Water Control District	N
Ray Kopacz	Stanfield Irrigation District	Y
Kyle Waggoner	UCSWCD - Soil & Water Conservation District	Y
Annette Kirkpatrick	Hermiston Irrigation District	Y
Scott Stanton	Umatilla County Fire District #1	Y
Dave Baty	East Umatilla Rural Fire Protection District	N
EXTERNAL PARTICIPANTS, TECHNICAL OR LEGAL ADVISORS		
Marcus Austin	National Weather Service - Pendleton	Y
Vincent Papol	NWS - Pendleton - Local Emergency Planning Committee	Y

Greg Lacquement	City of Pendleton - Local Emergency Planning Committee	N
Bob Patterson	City of Pendleton - Strategic Planning	N
Brett Thomas	USDA- Umatilla National Forest - Fire	N
Matt Hoehna	Oregon Department of Forestry - Fire	N
Justin Lauer (for Matt Hoena)	Oregon Department of Forestry - Fire	Y
Darrin Umbarger	Clearview Disability Resource Center	Y
Patty Perry	Confederated Tribes of the Umatilla Indian Reservation	N
Rob Burnside	Confederated Tribes of the Umatilla Indian Reservation	Y
John Shafer	Umatilla County Board of Commissioners	N
Troy Baker	Walla Walla Basin Watershed Council (WWBWC)	Y
Jim Gonzalez	US Army Corps of Engineers - Portland District	N
Linda Campbell	US Army Corps of Engineers - Walla Walla District	N
Michelle Frost	US Army Corps of Engineers - Walla Walla District	N
Rob Herres (For Linda Campbell & Michelle Frost)	US Army Corps of Engineers - Walla Walla District	Y
Susan Christensen	Greater Eastern Oregon Development Corporation (GEODC)	N
Bree Cubrilovic	Greater Eastern Oregon Development Corporation (GEODC)	Y
Terry Rowan	Umatilla County Sheriff's Office	N
Jim Littlefield	Umatilla County Sheriff's Office	N
LG Bullock	Umatilla County Public Works	N
Amie Bashant	Oregon Office of Emergency Management (OEM)	N
Anne Debbaut	Oregon DLCD	N
Meghan Dalton	Oregon Climate Change Research Institute (OCCRI)	N

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Umatilla County NHMP Update
Steering Committee Meeting
Tuesday January 26, 2021 from 1-2:30 pm

Join Zoom Meeting
https://us02web.zoom.us/j/85623597430?pwd=WG1LVVZZbEFsVlY4Ym9MWkcrUzZjZz09

AGENDA

I. Welcome & Introductions & Sign-In (10 min) Tom Roberts, Bob Waldher, Megan Green, Tierney Cimmiyotti, and Tricia Sears

II. Draft Umatilla County NHMP (15 min) Tricia et al
- Timelines and process of review and submittal to OEM and FEMA
- Risk Assessment, Hazards Annexes, Community Profile
- Updated Critical Facilities List (Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List 1-19-21) is part of the Risk Assessment
- Mitigation Strategy (includes mitigation actions, see below)
- Maps
  https://drive.google.com/drive/folders/1CusYEXm_oTAXy5v2ZL9lVZtAOK092B5q?usp=sharing
- Photos
  https://drive.google.com/drive/folders/1eldxCh1pj08-FZzCb8Dd-FSylGDtnf05?usp=sharing
-

III. Mitigation Actions (60 min) Tricia et al
- Review *2014 Umatilla County NHMP* mitigation actions, identify status, determine if those actions need to be retained as is, retained and modified, or deleted, also add new mitigation actions (Mitigation Actions Status Review)
- Definitions of Mitigation Actions Timelines (on back of agenda)

IV. Next Steps (5 min) Tricia
- Next Meeting is February 23, 2021
- Meeting notes and follow up

Materials
From Umatilla County: Copies of 2014 NHMP
From DLCD: Meeting Agenda; NHMP Steering Committee Roster 1-13-21; Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List 1-19-21; Draft NHMP; NHMP Maps; Mitigation Actions Status Review 12-16-20

Umatilla County NHMP, May 2014
The *2014 Umatilla County NHMP* has the mission and goals in Chapter 1.

Existing Mission: *To prevent loss and protect life, property, and the environment from the risk of natural hazards through coordination and cooperation amount public and private partners.*

New Mission Agreed by Consensus of the NHMP Steering Committee on 12/15/20:

To prevent loss and protect life, property, and the environment from natural hazards through coordination and cooperation among public and private partners. To mitigate the impacts of natural hazards and to increase the resilience of our community in our efforts to protect life, property, and the environment.

The plan goals describe the overall direction that the participating jurisdiction's agencies, organizations, and citizens can take toward mitigating risk from natural hazards.

Goal #1: *Protect life and property.*

Goal #2: *Public outreach.*

Goal #3: *Planned prevention.*

Goal #4: *Agency/citizen coordination.*

Goal #5: *Natural resource protection.*

Goal #6: *Emergency service planning.*

Mitigation Actions and Timeline

The *2014 Umatilla County NHMP* has mitigation actions in Chapter 2. Mitigation actions include both short and long-term activities. Each action item includes an estimate of the timeline for implementation and indicates a capacity to achieve the mitigation action.

Short-term action items (ST) are activities that may be implemented with existing resources and authorities in one to two years.

Long-term action items (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement.

Ongoing action items are activities that are currently being performed and will continue into the foreseeable future.

Umatilla County NHMP Update

Steering Committee Meeting Attendance

Tuesday, January 26, 2021

1:00 – 2:30 pm via Zoom

Roll call attendance taken by Tierney Cimmiyotti, Umatilla County

NAME	ORGANIZATION	ATTENDANCE
PROJECT MANAGEMENT TEAM		
Tom Roberts	County Emergency Management	Y
Bob Waldher	County Planning Department	Y
Megan Green	County Planning Department	Y
Tierney Cimmiyotti	County Planning Department	Y
Tricia Sears	Oregon DLCD	Y
Marian Lahav	Oregon DLCD	N
CITY REPRESENTATIVES		
George Cress	Pendleton	Y
Shane Garner	Milton-Freewater	Y
Clinton Spencer	Hermiston	Y
Michelle Fox	Athena	Y
Duane Thul	Weston	Y
Donna Neumann	Ukiah	N
David Slaght	Echo	Y
Benjamin Burgener	Stanfield	N
Brandon Seitz	Umatilla	N
Jacob Foutz	Umatilla	Y
Darla Huxel	Umatilla	N
Keith Kennedy	Umatilla	N
Graham Alderson	Adams	N
Carrie Bennett	Helix	N
Josh Smith	Helix	N
Kim Herron	Helix	N
Teri Bacus	Pilot Rock	Y
SPECIAL DISTRICT REPRESENTATIVES		
Teresa Kilmer	Walla Walla River Irrigation District	N
Brad Humbert	M-F Water Control District	N
Ray Kopacz	Stanfield Irrigation District	N
Kyle Waggoner	UCSWCD - Soil & Water Conservation District	Y
Annette Kirkpatrick	Hermiston Irrigation District	Y
Scott Stanton	Umatilla County Fire District #1	Y
Dave Baty	East Umatilla Rural Fire Protection District	N

Rachelle Lasater	East Umatilla Rural Fire Protection District	N
EXTERNAL PARTICIPANTS, TECHNICAL OR LEGAL ADVISORS		
Marcus Austin	National Weather Service - Pendleton	N
Vincent Papol	NWS - Pendleton - Local Emergency Planning Committee	Y
Greg Lacquement	City of Pendleton - Local Emergency Planning Committee	N
Bob Patterson	City of Pendleton - Strategic Planning Committee	N
Brett Thomas	USDA- Umatilla National Forest - Fire	N
Matt Hoehna	Oregon Department of Forestry - Fire	Y
Darrin Umbarger	Clearview Disability Resource Center	Y
Patty Perry	Confederated Tribes of the Umatilla Indian Reservation	Y
Rob Burnside	Confederated Tribes of the Umatilla Indian Reservation	Y
Dan Dorran	Umatilla County Board of Commissioners	Y
Troy Baker	Walla Walla Basin Watershed Council	N
Jim Gonzalez	US Army Corps of Engineers - Portland District	N
Linda Campbell	US Army Corps of Engineers - Walla Walla District	N
Michelle Frost	US Army Corps of Engineers - Walla Walla District	N
Rob Herres	US Army Corps of Engineers - Walla Walla District	Y
Susan Christensen	Greater Eastern Oregon Development Corporation	N
Bree Cubrilovic	Greater Eastern Oregon Development Corporation	Y
Terry Rowan	Umatilla County Sheriff's Office	N
Jim Littlefield	Umatilla County Sheriff's Office	N
LG Bullock	Umtilla County Public Works	N
Amie Bashant	Oregon Office of Emergency Management	N
Anne Debbaut	Oregon DLCD	N
Meghan Dalton	Oregon Climate Change Research Institute	N
Caryn Appler	Energy Trust of Oregon	Y

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Umatilla County NHMP Update
Steering Committee Meeting
Tuesday February 23, 2021 from 1-2:30 pm

Join Zoom Meeting
https://us02web.zoom.us/j/86916584315?pwd=dnVxalNUUC9XcjQrSTdNVEZ4VGJRQT09

AGENDA

I. Welcome & Introductions & Sign-In (10 min) Tom Roberts, Bob Waldher, Megan Green, Tierney Cimmiyotti, and Tricia Sears

II. Draft *2021 Umatilla County NHMP* (25 min) Tricia et al
- Draft *2021 Umatilla County NHMP* 2-10-21 comments and discussion (2021 Umatilla County Draft NHMP Table of Contents with Comments 2-10-21)
- Critical Facilities List in Risk Assessment (Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List 2-9-21), any additions or revisions?
- Mitigation actions, additions and revisions, see below
- Maps
https://drive.google.com/drive/folders/1CusYEXm_oTAXy5v2ZL9IVZtAOK092B5q?usp=sharing
- Photos
https://drive.google.com/drive/folders/1eldxCh1pj08-FZzCb8Dd-FSylGDtnf05?usp=sharing
- Timelines and process of review and submittal to OEM and FEMA

III. Oregon Energy Trust (25 min) Tricia et al
- Caryn Appler, Eastern Oregon Outreach Manager, and Jeni Hall, Program Manager – Advanced Solar (Energy Trust of Oregon One-Pager 2-1-21)

IV. Mitigation Actions (25 min) Tricia et al
- Review *2014 Umatilla County NHMP* mitigation actions, identify status, determine if those actions are retained as is, retained and modified, or deleted (Mitigation Actions Status Review)
- Review the new mitigation actions (Mitigation Actions 2021 Umatilla County NHMP)
- Definitions of Mitigation Actions Timelines (on back of agenda)

V. Next Steps (5 min) Tricia
- Next Meeting is TBA
- Meeting notes and follow up

Materials
From Umatilla County: Copies of 2014 NHMP
From DLCD: Meeting Agenda; NHMP Steering Committee Roster 2-16-21; 2021 Umatilla County Draft NHMP Table of Contents with Comments 2-10-21; Energy Trust Oregon One-Pager 2-1-21; Critical/ Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List 2-9-21; Draft NHMP 2-10-21; Mitigation Actions Status Review 2-17-21; Mitigation Actions 2021 Umatilla County NHMP 2-17-21
Umatilla County NHMP, May 2014

The *2014 Umatilla County NHMP* has the mission and goals in Chapter 1.

Existing Mission: *To prevent loss and protect life, property, and the environment from the risk of natural hazards through coordination and cooperation amount public and private partners.*

New Mission Agreed by Consensus of the NHMP Steering Committee on 12/15/20:

To prevent loss and protect life, property, and the environment from natural hazards through coordination and cooperation among public and private partners. To mitigate the impacts of natural hazards and to increase the resilience of our community in our efforts to protect life, property, and the environment.

The plan goals describe the overall direction that the participating jurisdiction's agencies, organizations, and citizens can take toward mitigating risk from natural hazards.

Goal #1: *Protect life and property.*

Goal #2: *Public outreach.*

Goal #3: *Planned prevention.*

Goal #4: *Agency/citizen coordination.*

Goal #5: *Natural resource protection.*

Goal #6: *Emergency service planning.*

Mitigation Actions and Timeline

The *2014 Umatilla County NHMP* has mitigation actions in Chapter 2. Mitigation actions include both short and long-term activities. Each action item includes an estimate of the timeline for implementation and indicates a capacity to achieve the mitigation action.

Short-term action items (ST) are activities that may be implemented with existing resources and authorities in one to two years.

Long-term action items (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement.

Ongoing action items are activities that are currently being performed and will continue into the foreseeable future.

Umatilla County NHMP Update

Steering Committee Meeting Attendance

Tuesday, February 23, 2021

1:00 – 2:30 pm via Zoom

Roll call attendance taken by Tierney Cimmiyotti, Umatilla County

NAME	ORGANIZATION	ATTENDANCE
PROJECT MANAGEMENT TEAM		
Tom Roberts	County Emergency Management	N
Bob Waldher	County Planning Department	Y
Megan Green	County Planning Department	Y
Tierney Cimmiyotti	County Planning Department	Y
Tricia Sears	Oregon DLCD	Y
Marian Lahav	Oregon DLCD	N
CITY REPRESENTATIVES		
George Cress	Pendleton	Y
Shane Garner	Milton-Freewater	Y
Clinton Spencer	Hermiston	Y
Michelle Fox	Athena	Y
Duane Thul	Weston	Y
Donna Neumann	Ukiah	N
David Slaght	Echo	Y
Benjamin Burgener	Stanfield	Y
Brandon Seitz	Umatilla	N
Jacob Foutz	Umatilla	Y
Darla Huxel	Umatilla	N
Keith Kennedy	Umatilla	N
Graham Alderson	Adams	Y
Carrie Bennett	Helix	N
Josh Smith	Helix	N
Kim Herron	Helix	N
Teri Bacus	Pilot Rock	Y
SPECIAL DISTRICT REPRESENTATIVES		
Teresa Kilmer	Walla Walla River Irrigation District	Y
Brad Humbert	M-F Water Control District	N
Ray Kopacz	Stanfield Irrigation District	Y
Kyle Waggoner	UCSWCD - Soil & Water Conservation District	N
Annette Kirkpatrick	Hermiston Irrigation District	Y
Scott Stanton	Umatilla County Fire District #1	Y
Dave Baty	East Umatilla Rural Fire Protection District	N
EXTERNAL PARTICIPANTS, TECHNICAL OR LEGAL ADVISORS		
Marcus Austin	National Weather Service - Pendleton	N
Vincent Papol	NWS - Pendleton - Local Emergency Planning Committee	N

Greg Lacquement	City of Pendleton - Local Emergency Planning Committee	Y
Bob Patterson	City of Pendleton - Strategic Planning Committee	N
Brett Thomas	USDA- Umatilla National Forest - Fire	N
Matt Hoehna	Oregon Department of Forestry - Fire	Y
Darrin Umbarger	Clearview Disability Resource Center	Y
Patty Perry	Confederated Tribes of the Umatilla Indian Reservation	Y
Rob Burnside	Confederated Tribes of the Umatilla Indian Reservation	N
Caleb Minthorn	Confederated Tribes of the Umatilla Indian Reservation	Y
Dan Dorran	Umatilla County Board of Commissioners	Y
Troy Baker	Walla Walla Basin Watershed Council	N
Jim Gonzalez	US Army Corps of Engineers - Portland District	N
Linda Campbell	US Army Corps of Engineers - Walla Walla District	N
Michelle Frost	US Army Corps of Engineers - Walla Walla District	N
Susan Christensen	Greater Eastern Oregon Development Corporation	N
Bree Cubrilovic	Greater Eastern Oregon Development Corporation	Y
Terry Rowan	Umatilla County Sheriff's Office	N
Jim Littlefield	Umatilla County Sheriff's Office	N
LG Bullock	Umtilla County Public Works	N
Amie Bashant	Oregon Office of Emergency Management	N
Anne Debbaut	Oregon DLCD	N
Meghan Dalton	Oregon Climate Change Research Institute	N
Caryn Appler	Energy Trust of Oregon	Y
Jeni Hall	Energy Trust of Oregon	Y

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Umatilla County NHMP Update
Steering Committee SPECIAL Meeting
Tuesday April 6, 2021 from 2:00-3:00 pm

Join Zoom Meeting
https://us02web.zoom.us/j/85496610602?pwd=aFNpdDFUOFllWW1ObFVhWlo5WTViQT09

AGENDA

I. **Welcome & Introductions & Sign-In (10 min) Tom Roberts, Bob Waldher, Megan Green, Tierney Cimmiyotti, and Tricia Sears**

II. **Overview of and Q&A about HMGP Funding (50 min) Anna Feigum and Joseph Murray**
- The Hazard Mitigation Grant Program (HMGP) question and answer session is an opportunity for potential subapplicants to connect with the State Hazard Mitigation Officer (SHMO) or the Deputy SHMO. HMGP can seem complex and difficult to administer. Potential subapplicants can ask how HMGP funds can be leveraged, alternatives to the cost share, and potential next steps. We encourage attendees to ask questions about potential projects and ways we can continue to build a safer and more resilient Oregon.
- Anna Feigum, Deputy State Hazard Mitigation Officer, OEM, office 503-378-2260 (voice only), cell 503-798-7240 (text & voice), anna.r.feigum@state.or.us and shmo@mil.state.or.us
- Joseph Murray, Mitigation Planner, OEM, cell 971-719-0950, joseph.murray@state.or.us

III. **Link to 2021 Umatilla County MJNHMP (FYI)** **Tricia**
- https://webserver.lcd.state.or.us/Uploads/Inbound

IV. **Next Steps (2 min)** **Tricia**
- Next Meeting is May 18, 2021 at 1 pm
- Meeting notes and follow up

Materials
From DLCD: Meeting Agenda
From OEM: PowerPoint Presentation

2021 Umatilla County NHMP
The *2021 Umatilla County NHMP* has the mission and goals in the Executive Summary.

New Mission Agreed by Consensus of the NHMP Steering Committee on 12/15/20:

To prevent loss and protect life, property, and the environment from natural hazards through coordination and cooperation among public and private partners. To mitigate the impacts of natural hazards and to increase the resilience of our community in our efforts to protect life, property, and the environment.

The plan goals describe the overall direction that the participating jurisdiction's agencies, organizations, and citizens can take toward mitigating risk from natural hazards.

Goal #1: *Protect life and property.*

Goal #2: *Public outreach.*

Goal #3: *Planned prevention.*

Goal #4: *Agency/citizen coordination.*

Goal #5: *Natural resource protection.*

Goal #6: *Emergency service planning.*

Mitigation Actions and Timeline

The *2021 Umatilla County NHMP* has mitigation actions in Volume I Section 3 Mitigation Strategy. Mitigation actions include both short and long-term activities. Each action item includes an estimate of the timeline for implementation and indicates a capacity to achieve the mitigation action.

Short-term action items (ST) are activities that may be implemented with existing resources and authorities in one to two years.

Long-term action items (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement.

Ongoing action items are activities that are currently being performed and will continue into the foreseeable future.

Umatilla County NHMP Update		
Steering Committee Meeting Attendance		
Tuesday, April 6, 2021		
2:00-3:00 pm via Zoom		
Attendance taken by Tricia Sears, DLCD and Bob Waldher and Megan Green, Umatilla County		
NAME	**ORGANIZATION**	**ATTENDANCE**
PROJECT MANAGEMENT TEAM		
Tom Roberts	County Emergency Management	Y
Bob Waldher	County Planning Department	Y
Megan Green	County Planning Department	Y
Tierney Cimmiyotti	County Planning Department	N
Tricia Sears	Oregon DLCD	Y
Marian Lahav	Oregon DLCD	N
CITY REPRESENTATIVES		
George Cress	Pendleton	Y
Shane Garner	Milton-Freewater	Y
Clinton Spencer	Hermiston	Y
Michelle Fox	Athena	N
Duane Thul	Weston	N
Donna Neumann	Ukiah	N
David Slaght	Echo	Y
Benjamin Burgener	Stanfield	Y
Brandon Seitz	Umatilla	N
Jacob Foutz	Umatilla	Y
Darla Huxel	Umatilla	N
Keith Kennedy	Umatilla	N
Graham Alderson	Adams	N
Carrie Bennett	Helix	N
Josh Smith	Helix	N
Kim Herron	Helix	N
Teri Bacus	Pilot Rock	N
SPECIAL DISTRICT REPRESENTATIVES		
Teresa Kilmer	Walla Walla River Irrigation District	N
Brad Humbert	M-F Water Control District	N
Ray Kopacz	Stanfield Irrigation District	N
Kyle Waggoner	UCSWCD - Soil & Water Conservation District	N
Annette Kirkpatrick	Hermiston Irrigation District	N
Scott Stanton	Umatilla County Fire District #1	N
Dave Baty	East Umatilla Rural Fire Protection District	N

EXTERNAL PARTICIPANTS, TECHNICAL OR LEGAL ADVISORS		
Marcus Austin	National Weather Service - Pendleton	N
Vincent Papol	NWS - Pendleton - Local Emergency Planning Committee	Y
Greg Lacquement	City of Pendleton - Local Emergency Planning Committee	Y
Bob Patterson	City of Pendleton - Strategic Planning Committee	N
Brett Thomas	USDA- Umatilla National Forest - Fire	N
Matt Hoehna	Oregon Department of Forestry - Fire	N
Darrin Umbarger	Clearview Disability Resource Center	Y
Patty Perry	Confederated Tribes of the Umatilla Indian Reservation	Y
Rob Burnside	Confederated Tribes of the Umatilla Indian Reservation	N
Caleb Minthorn	Confederated Tribes of the Umatilla Indian Reservation	N
Dan Dorran	Umatilla County Board of Commissioners	Y
Troy Baker	Walla Walla Basin Watershed Council	N
Jim Gonzalez	US Army Corps of Engineers - Portland District	N
Linda Campbell	US Army Corps of Engineers - Walla Walla District	N
Michelle Frost	US Army Corps of Engineers - Walla Walla District	N
Susan Christensen	Greater Eastern Oregon Development Corporation	N
Bree Cubrilovic	Greater Eastern Oregon Development Corporation	Y
Terry Rowan	Umatilla County Sheriff's Office	N
Jim Littlefield	Umatilla County Sheriff's Office	N
LG Bullock	Umatilla County Public Works	N
Stephen Richardson	Oregon Office of Emergency Management	Y
Joseph Murray	Oregon Office of Emergency Management	Y
Anna Feigum	Oregon Office of Emergency Management	Y
Amie Bashant	Oregon Office of Emergency Management	N
Celinda Adair	Oregon DLCD	N
Anne Debbaut	Oregon DLCD	Y
Meghan Dalton	Oregon Climate Change Research Institute	N
Caryn Appler	Energy Trust of Oregon	Y
Jeni Hall	Energy Trust of Oregon	N

Greg Lacquement	City of Pendleton – Local Emergency Planning Committee	Y
Bob Patterson	City of Pendleton – Strategic Planning Committee	N
Brett Thomas	USDA- Umatilla National Forest - Fire	N
Matt Hoehna	Oregon Department of Forestry - Fire	N
Darrin Umbarger	Clearview Disability Resource Center	Y
Patty Perry	Confederated Tribes of the Umatilla Indian Reservation	Y
Rob Burnside	Confederated Tribes of the Umatilla Indian Reservation	N
Caleb Minthorn	Confederated Tribes of the Umatilla Indian Reservation	N
Dan Dorran	Umatilla County Board of Commissioners	Y
Troy Baker	Walla Walla Basin Watershed Council	N
Jim Gonzalez	US Army Corps of Engineers - Portland District	N
Linda Campbell	US Army Corps of Engineers - Walla Walla District	N
Michelle Frost	US Army Corps of Engineers - Walla Walla District	N
Susan Christensen	Greater Eastern Oregon Development Corporation	N
Bree Cubrilovic	Greater Eastern Oregon Development Corporation	Y
Terry Rowan	Umatilla County Sheriff's Office	N
Jim Littlefield	Umatilla County Sheriff's Office	N
LG Bullock	Umatilla County Public Works	N
Stephen Richardson	Oregon Office of Emergency Management	Y
Joseph Murray	Oregon Office of Emergency Management	Y
Anna Feigum	Oregon Office of Emergency Management	Y
Amie Bashant	Oregon Office of Emergency Management	N
Celinda Adair	Oregon DLCD	N
Anne Debbaut	Oregon DLCD	Y
Meghan Dalton	Oregon Climate Change Research Institute	N
Caryn Appler	Energy Trust of Oregon	Y
Jeni Hall	Energy Trust of Oregon	N

UMATILLA COUNTY
est. 1862

Umatilla County NHMP Update
Steering Committee Meeting
Tuesday May 18, 2021 from 1-2:30 pm

Join Zoom Meeting
https://us02web.zoom.us/j/84920179695?pwd=SXBTb1hRRmdQMUtIR2ZsMWs5WDNxUT09

AGENDA

I. **Welcome & Introductions & Sign-In (10 min) Tom Roberts, Bob Waldher, Megan Green, Tierney Cimmiyotti, and Tricia Sears**

II. **Draft *2021 Umatilla County NHMP* Comments Update & Work Session (45 min) Tricia et al**
- **Draft *2021 Umatilla County NHMP* 3-31-21, comments from OEM and FEMA's concurrent review**
- **Draft *2021 Umatilla County NHMP* May 2021, has been revised based on comments**
- **We have three items from FEMA to address; these are described below and we will identify our responses so that the NHMP can be resubmitted to FEMA**

Documentation of Ukiah's participation – In Appendix A Planning Process, we need to bolster the description of how Ukiah has participated as their lack of attendance was identified by FEMA as a concern. We can add a general description of overall participation and make comments specific to each jurisdiction as applicable.

Documentation of Walla Walla River Irrigation District resources to address hazard mitigation – In Tables B-20 and 4-1, there are no plans, policies, and programs listed for the Walla Walla River Irrigation District. We need to identify what resources they have to address hazard mitigation. We may do this via the tables and corresponding text description.

Flood Annex Table FL-5, Umatilla County NFIP Information – We need to identify the date of the flood ordinances for Umatilla County, Adams, Athena, Helix, Ukiah, Weston, and the Umatilla Reservation.

Community	Date of Flood Ordinance
Umatilla County	
Adams	
Athena	
Echo	Updated August 2010
Helix	
Hermiston	2019
Milton-Freewater	2010
Pendleton	August 6, 2010

Pilot Rock	2001
Stanfield	2017
Ukiah	
Umatilla	Updated 2010
Weston	
Umatilla Reservation	

III. Review of Timelines and Process from Here (30 min) **Tricia et al**

- **Resubmit to FEMA, obtain FEMA APA letter, obtain local jurisdiction approvals, obtain full FEMA approval**

From the 12/16/20 Umatilla County NHMP Project Schedule

March - April 2021	**Project Progress – Review by OEM and Submittal to FEMA**
SC: NA	• OEM Reviews NHMP. Make any changes, if requested, from OEM. If no changes are requested, submit to FEMA.
April - May 2021	**Project Progress – Review by FEMA**
SC: NA	• Make changes, if requested, from FEMA. • Once FEMA is ok with the NHMP, receive "Approvable Pending Adoption" (APA) from FEMA.
June – July 2021	**Project Progress - Adoption**
SC: NA	• Schedule NHMP for adoption with County and City authorities. County and City authorities adopt the NHMP. • Receive the FEMA Final Approval letter. • DLCD provides final PDF copy of approved NHMP.

IV. Next Steps (5 min) **Tricia**

- **Next Meeting is TBA**
- **Meeting notes and follow up**

Materials
From Umatilla County: Copies of 2014 NHMP
From DLCD: Meeting Agenda; Draft NHMP 3-31-21;

Umatilla County NHMP Update		
Steering Committee Meeting Attendance		
Tuesday, May 18, 2021		
1:00-3:00 pm via Zoom		
Attendance taken by Tierney Cimmiyotti, Umatilla County		
NAME	**ORGANIZATION**	**ATTENDANCE**
PROJECT MANAGEMENT TEAM		
Tom Roberts	County Emergency Management	Y
Bob Waldher	County Planning Department	Y
Megan Green	County Planning Department	Y
Tierney Cimmiyotti	County Planning Department	Y
Tricia Sears	Oregon DLCD	Y
Marian Lahav	Oregon DLCD	N
CITY REPRESENTATIVES		
George Cress	Pendleton	Y
Shane Garner	Milton Freewater	Y
Clinton Spencer	Hermiston	Y
Michelle Fox	Athena	Y
Duane Thul	Weston	N
Donna Neumann	Ukiah	N
David Slaght	Echo	Y
Benjamin Burgener	Stanfield	Y
Brandon Seitz	Umatilla	N
Jacob Foutz	Umatilla	Y
Darla Huxel	Umatilla	N
Keith Kennedy	Umatilla	N
Graham Alderson	Adams	Y
Carrie Bennett	Helix	N
Josh Smith	Helix	N
Kim Herron	Helix	N
Teri Bacus	Pilot Rock	Y
SPECIAL DISTRICT REPRESENTATIVES		
Teresa Kilmer	Walla Walla River Irrigation District	Y
Brad Humbert	M-F Water Control District	N
Ray Kopacz	Stanfield Irrigation District	Y
Kyle Waggoner	UCSWCD - Soil & Water Conservation District	Y
Annette Kirkpatrick	Hermiston Irrigation District	N
Scott Stanton	Umatilla County Fire District #1	Y

Dave Baty	East Umatilla Rural Fire Protection District	N
EXTERNAL PARTICIPANTS, TECHNICAL OR LEGAL ADVISORS		
Marcus Austin	National Weather Service - Pendleton	N
Vincent Papol	NWS - Pendleton - Local Emergency Planning Committee	N
Greg Lacquement	City of Pendleton - Local Emergency Planning Committee	Y
Bob Patterson	City of Pendleton - Strategic Planning Committee	N
Brett Thomas	USDA- Umatilla National Forest - Fire	N
Matt Hoehna	Oregon Department of Forestry - Fire	N
Darrin Umbarger	Clearview Disability Resource Center	N
Patty Perry	Confederated Tribes of the Umatilla Indian Reservation	Y
Rob Burnside	Confederated Tribes of the Umatilla Indian Reservation	N
Caleb Minthorn	Confederated Tribes of the Umatilla Indian Reservation	N
Dan Dorran	Umatilla County Board of Commissioners	Y
Troy Baker	Walla Walla Basin Watershed Council	N
Jim Gonzalez	US Army Corps of Engineers - Portland District	N
Linda Campbell	US Army Corps of Engineers - Walla Walla District	N
Michelle Frost	US Army Corps of Engineers - Walla Walla District	N
Susan Christensen	Greater Eastern Oregon Development Corporation	N
Bree Cubrilovic	Greater Eastern Oregon Development Corporation	N
Gina Miller	Umatilla County Code Enforcement Program Coordinator	Y
Terry Rowan	Umatilla County Sheriff's Office	N
Jim Littlefield	Umatilla County Sheriff's Office	N
LG Bullock	Umtilla County Public Works	N
Celinda Adair	Oregon DLCD	N
Anne Debbaut	Oregon DLCD	N
Meghan Dalton	Oregon Climate Change Research Institute	N
Caryn Appler	Energy Trust of Oregon	Y
Jeni Hall	Energy Trust of Oregon	N

Umatilla County NHMP Flyer

Umatilla County
Natural Hazards Mitigation Plan Update

UMATILLA COUNTY
est. 1862

About the Plan

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This project is made possible by the federal Hazard Mitigation Grant Program (HMGP). The HMGP assists states, tribes, and local communities in implementing long-term hazard mitigation measures following a major disaster declaration to reduce the risk of loss of life and property from future disasters.

A Steering Committee, co-chaired by County Emergency Manager, Thomas Roberts, and County Planning Director, Robert Waldher, is working with DLCD to update the NHMP. The NHMP is targeted for completion and adoption by mid-2021.

DLCD

"to prevent loss and protect life, property and the environment from the risk of natural hazards through coordination and cooperation among public and private partners"
Umatilla County 2014 NHMP

Recent flood disasters in Umatilla County highlight the critical need for improving community resiliency to these types of events and maintaining disaster-related funding.

Umatilla County Natural Hazards

Winter Storms • Summer Storms • Earthquakes
Droughts • Floods • Volcanic Events
Landslides • Wildfire

Why engage in natural hazard mitigation planning?

- **to avoid disasters** by reducing or eliminating long-term risk to people, property, and the environment from natural hazards
- **to increase safety and resilience** by integrating hazard mitigation into local plans, programs and policies
- **to maintain eligibility** for disaster-related funding

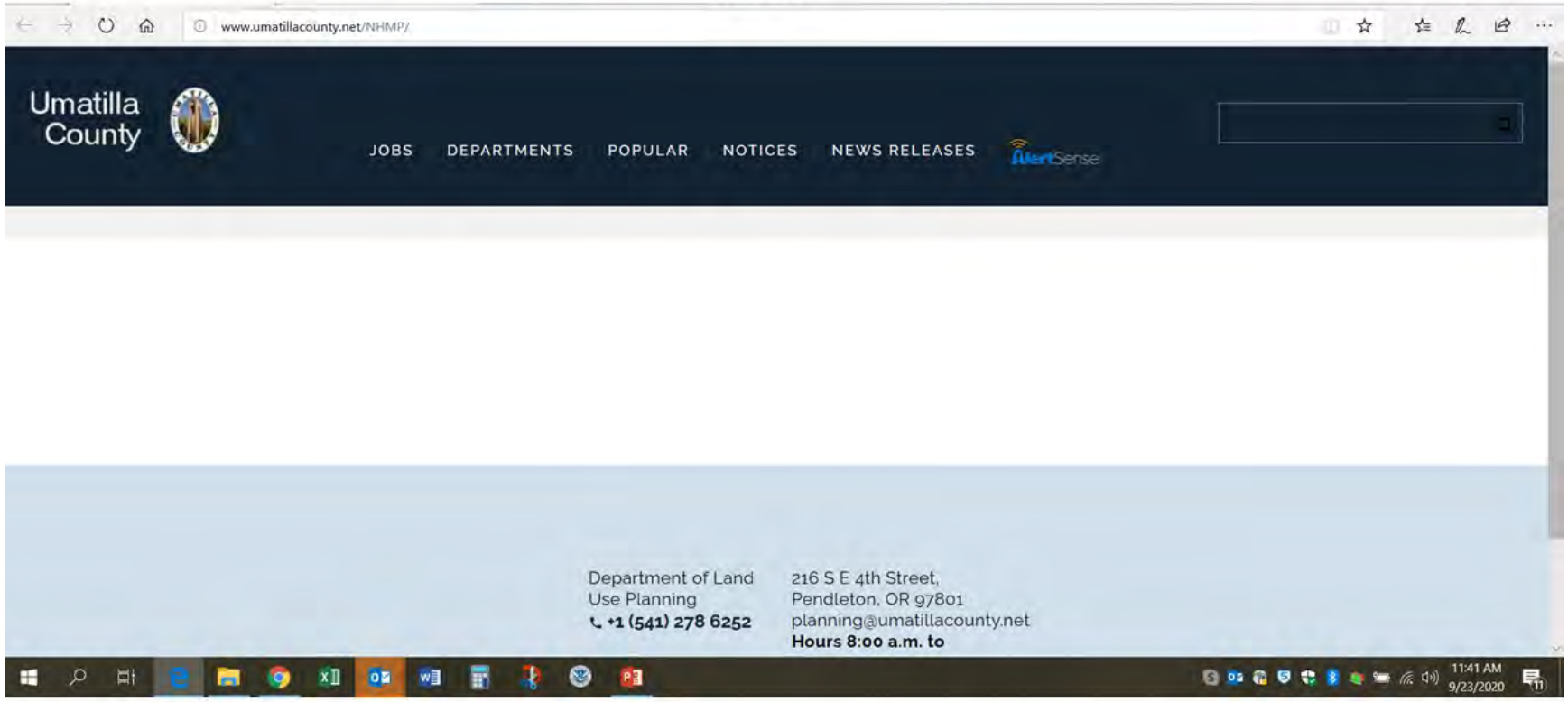
MORE INFORMATION:

Thomas Roberts, Emergency Manager | Umatilla County
Phone: 541-966-3706 | Email: thomas.roberts@umatillacounty.net

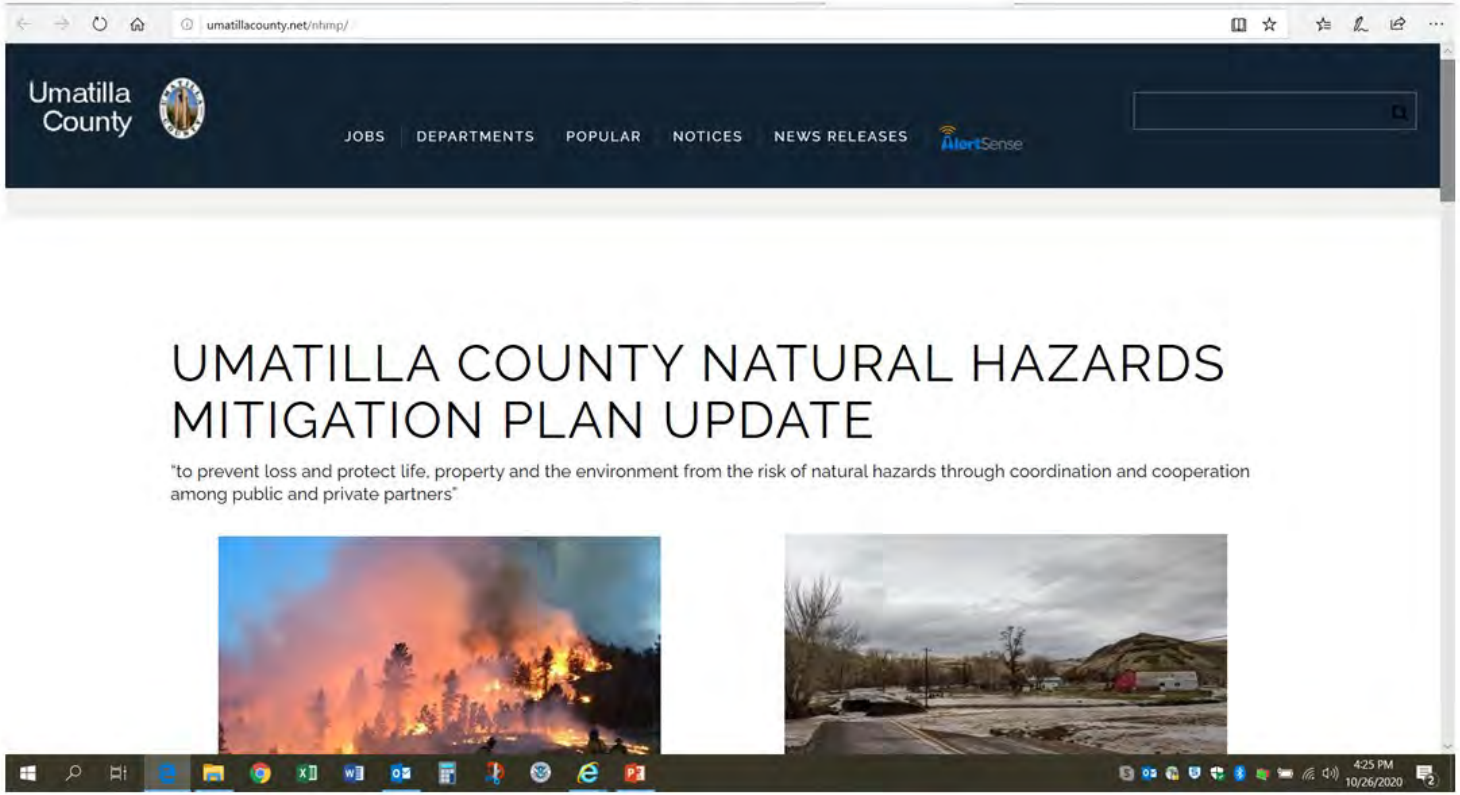
Robert Waldher, Planning Director | Umatilla County
Phone: 541-278-6252 | Email: robert.waldher@umatillacounty.net

Website and Facebook Screen Shots, and Events

Umatilla County
New page on the website specific to the Natural Hazards Mitigation Plan (NHMP) update
http://www.umatillacounty.net/NHMP/
9/23/20



Umatilla County Website
http://umatillacounty.net/nhmp/
10/26/20



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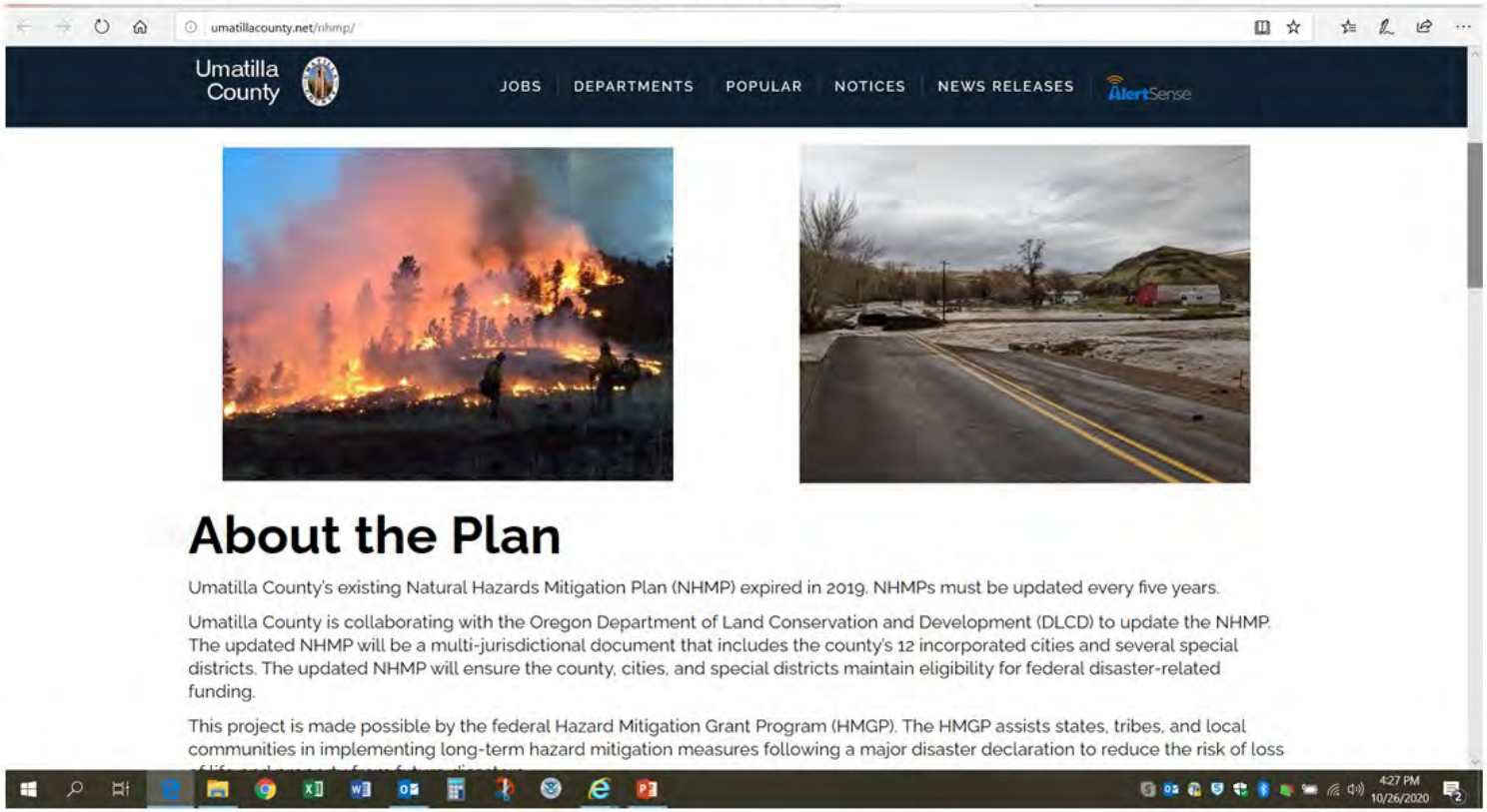
10/26/20



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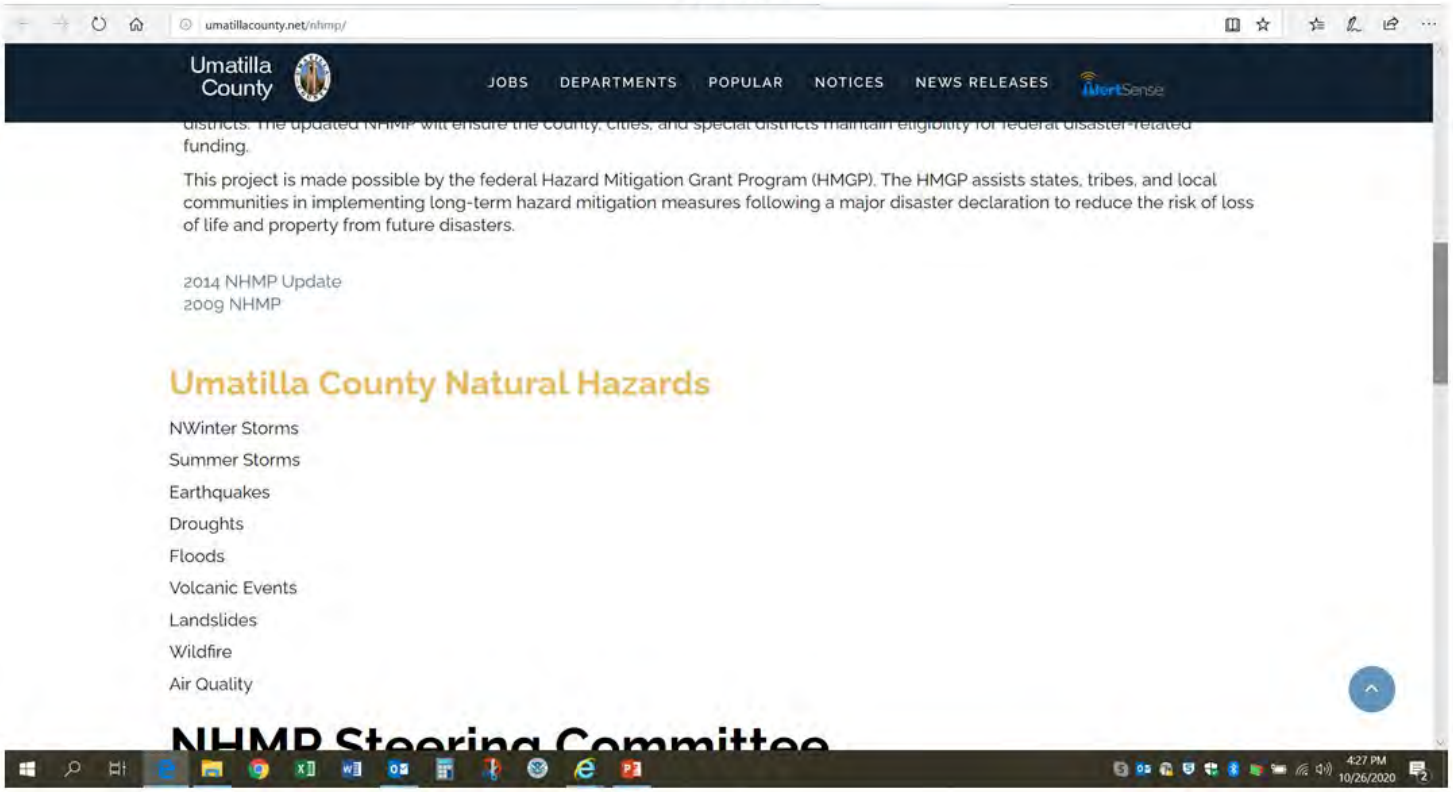

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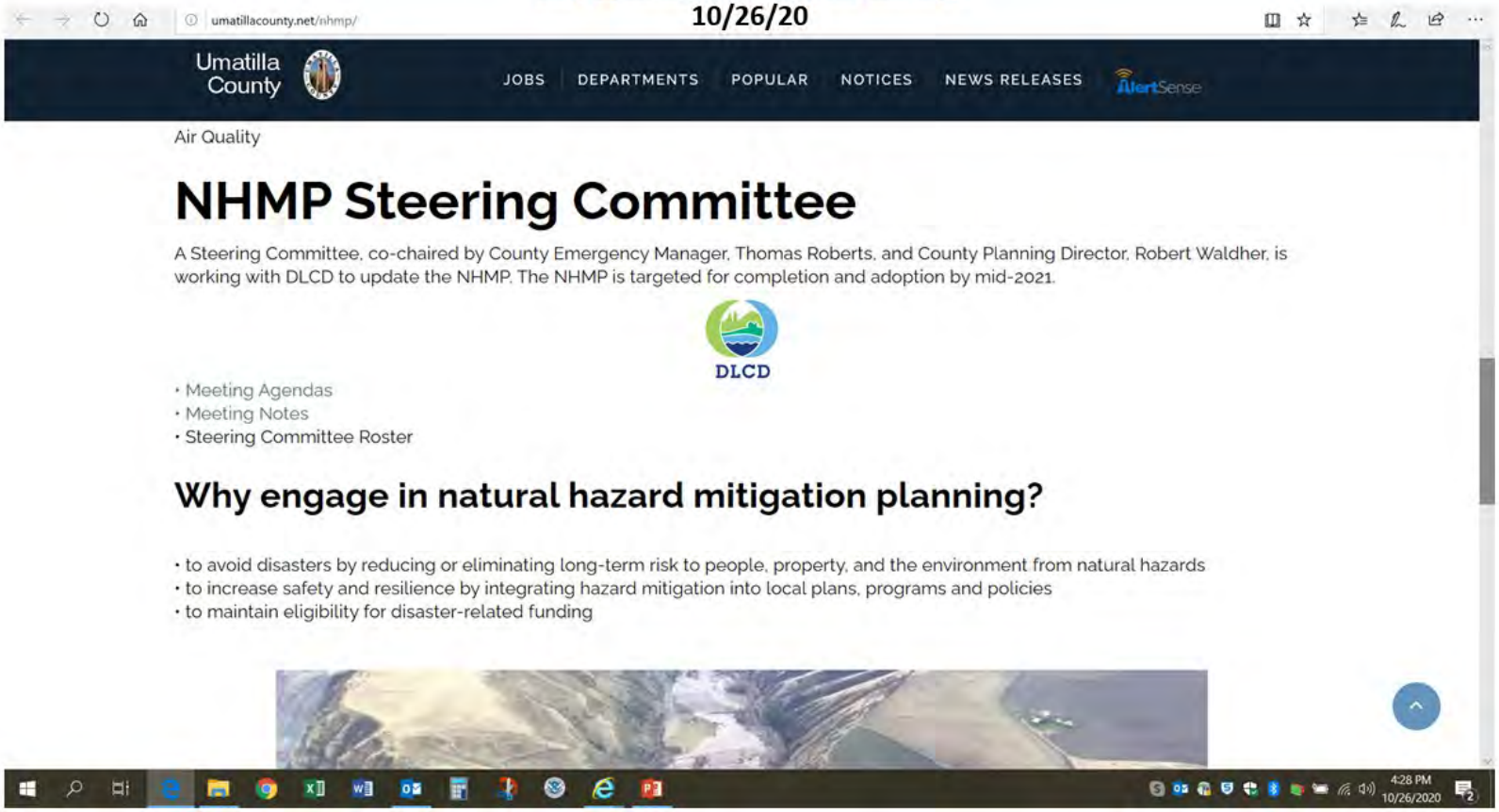

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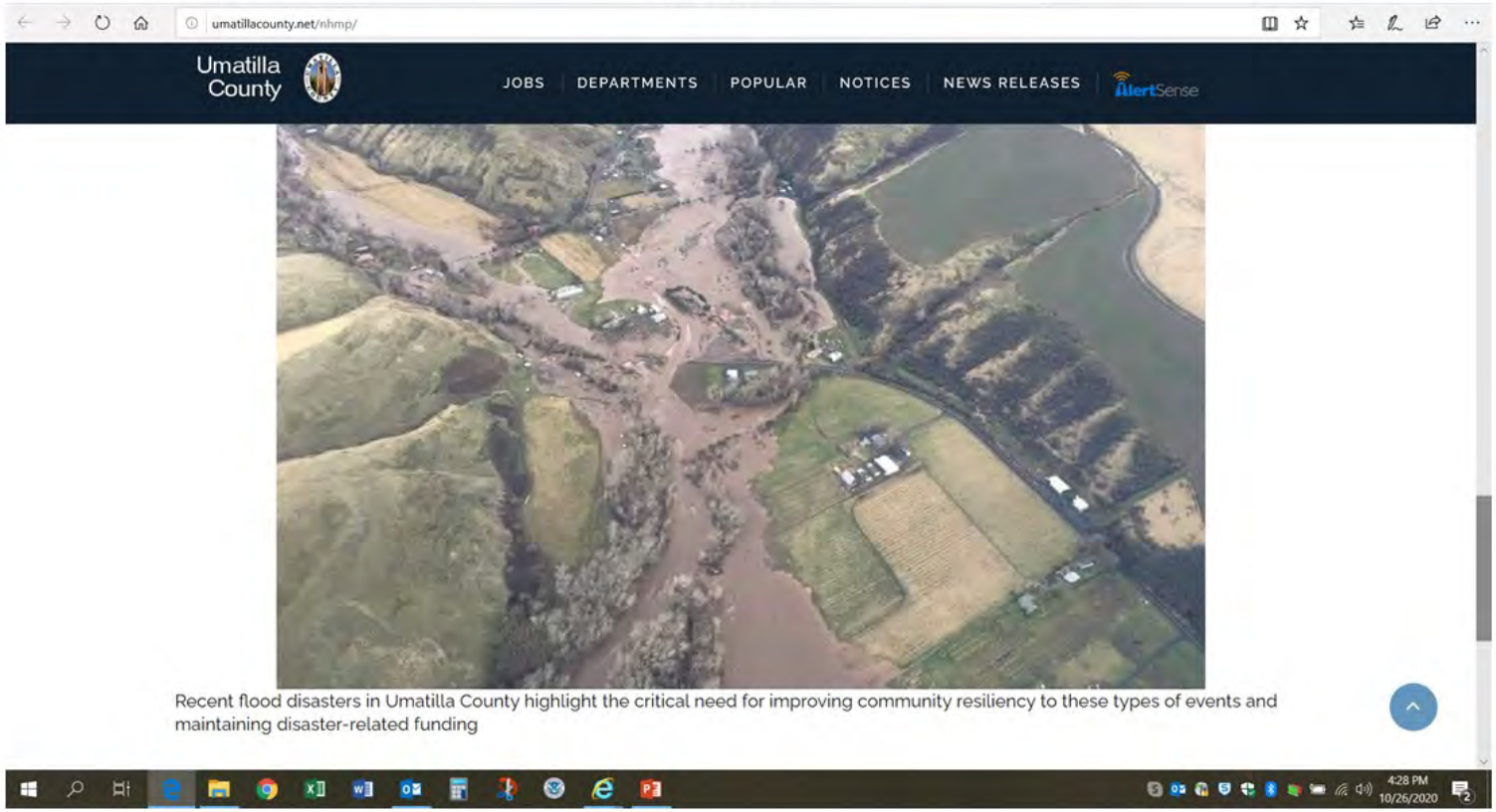


NHMP Steering Committee
Agenda, Minutes & Notes

Meeting Date	Agendas	Notes	Roster
09/29/2020	Meeting Agenda	Meeting Notes	Roster
10/27/2020	Meeting Agenda	Meeting Notes	Roster
11/17/2020	Meeting Agenda	Meeting Notes	Roster
12/15/2020	Meeting Agenda	Meeting Notes	Roster
1/26/2021	Meeting Agenda	Meeting Notes	Roster

Department of Land Use Planning
+1 (541) 278 6252

216 S E 4th Street,
Pendleton, OR
97801
planning@umatillacounty.net
Hours 8:00 a.m. to 5:00 p.m. M-F

City of Adams

http://www.cityofadamsoregon.com/

10/28/20

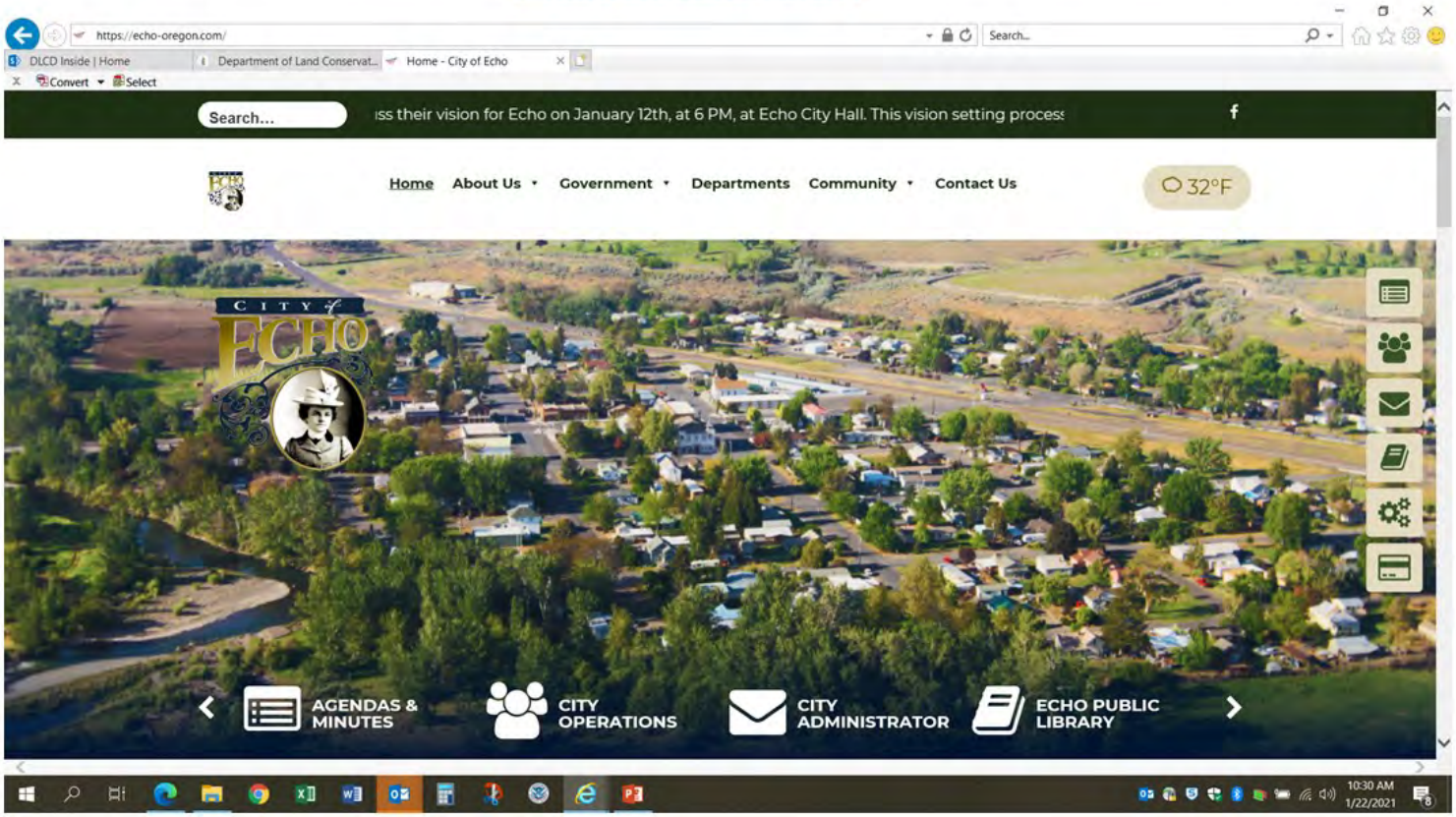
City of Adams

http://www.cityofadamsoregon.com/

10/28/20

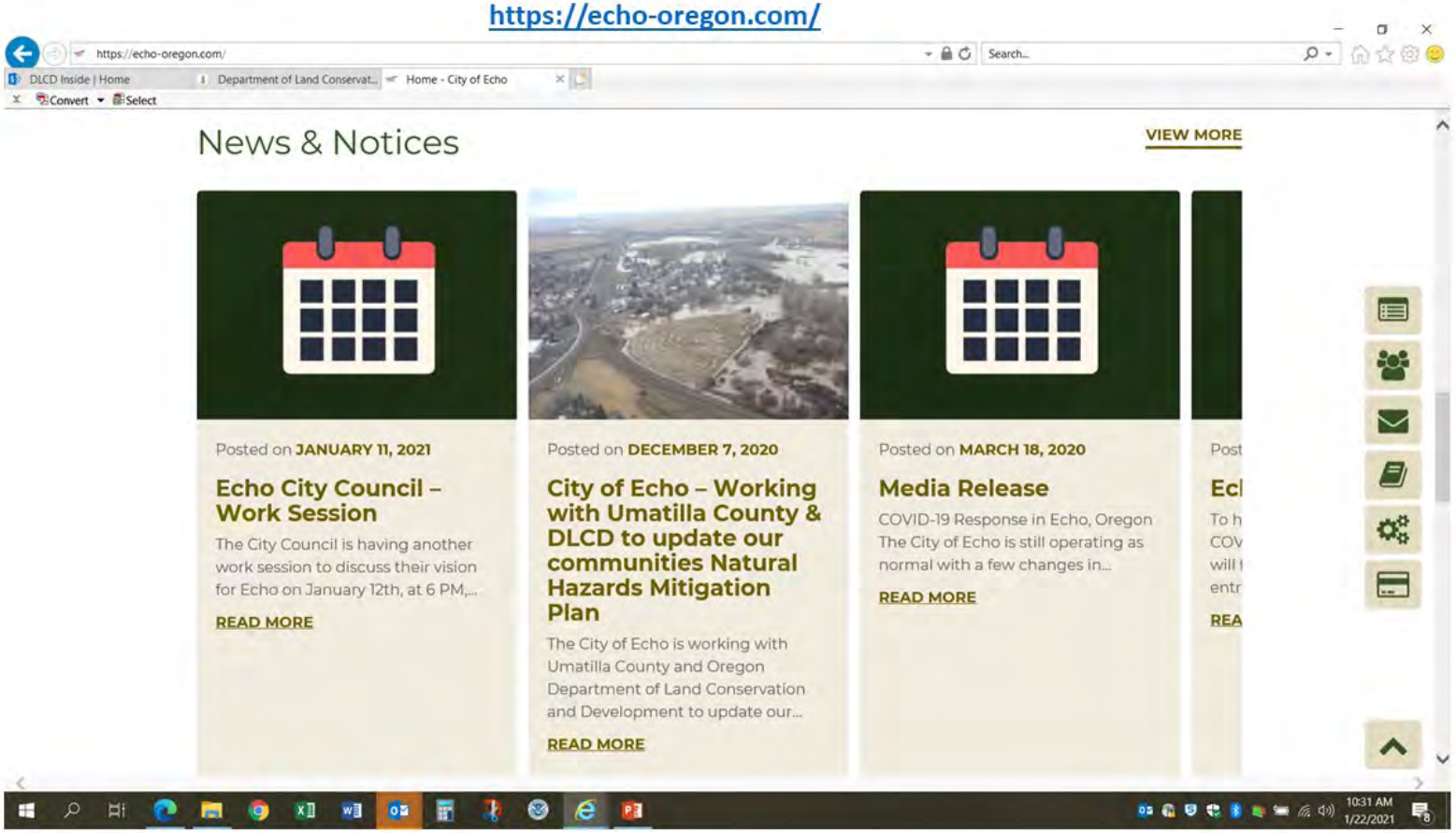
City of Echo 1-22-21

https://echo-oregon.com/



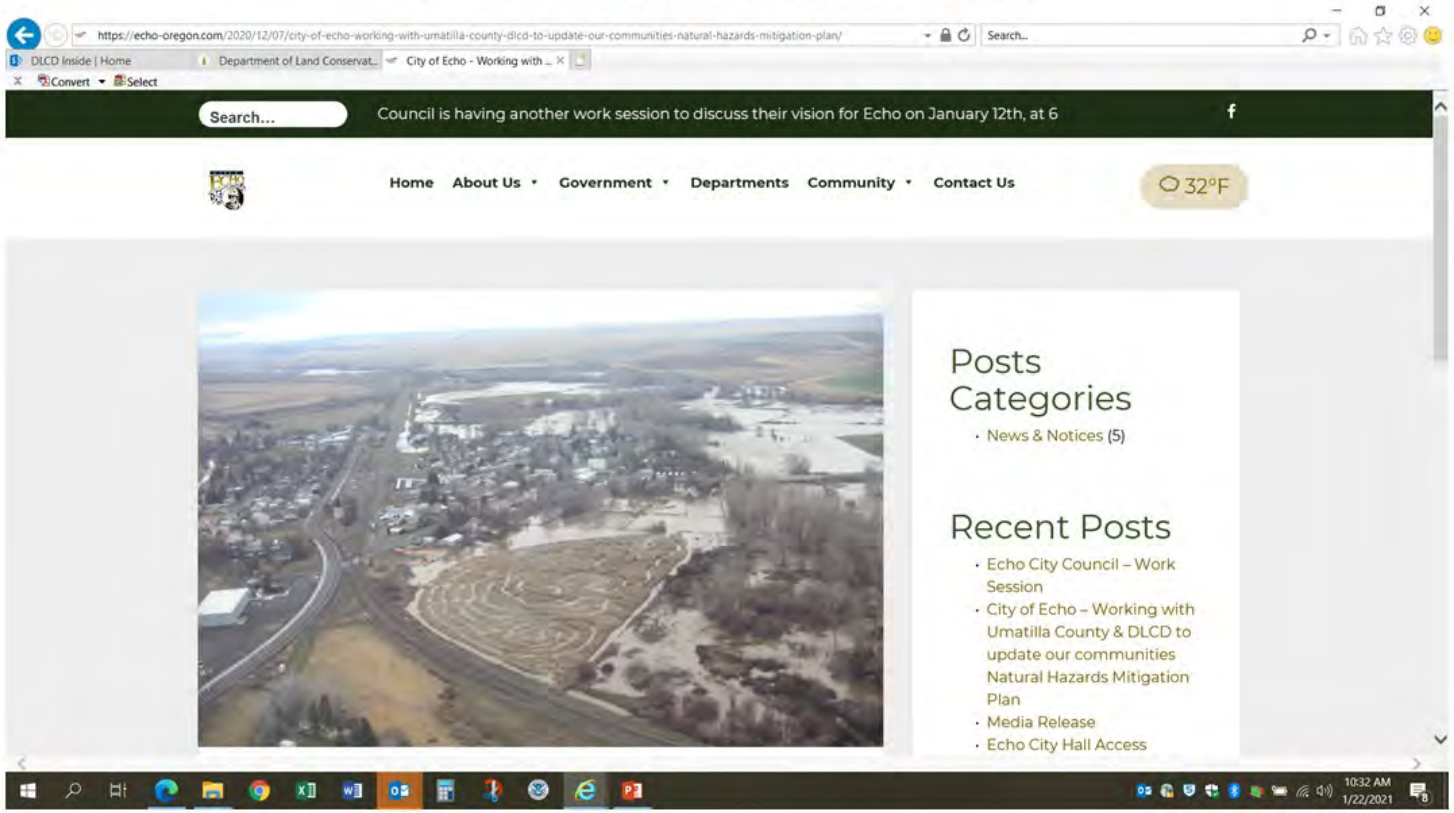
City of Echo 1-22-21

https://echo-oregon.com/

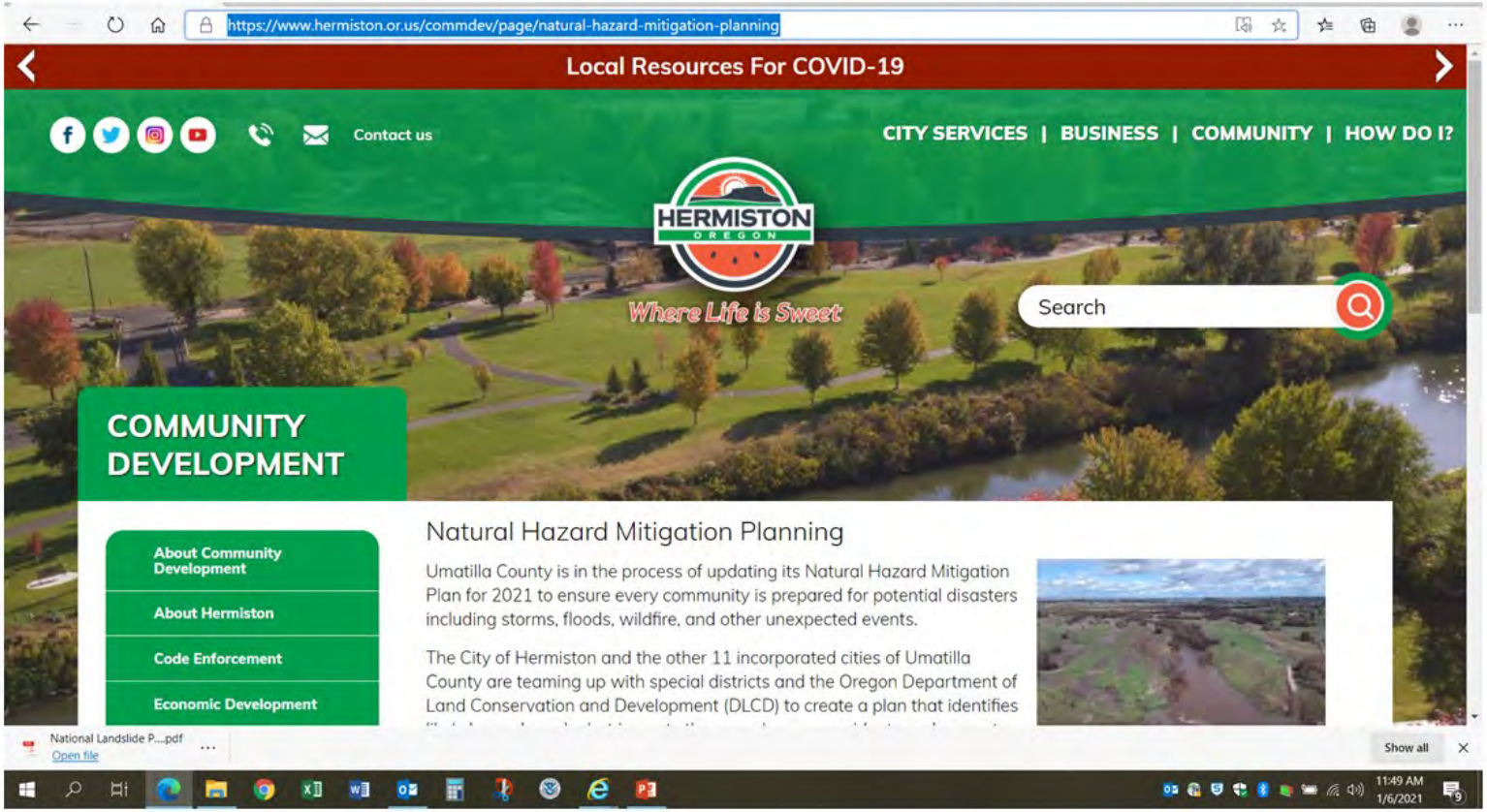


City of Echo 1/22/21

https://echo-oregon.com/2020/12/07/city-of-echo-working-with-umatilla-county-dlcd-to-update-our-communities-natural-hazards-mitigation-plan/



City of Hermiston website 1/6/21
https/www.Hermiston.or.us/commdev/page/natural-hazard-mitigation-planning



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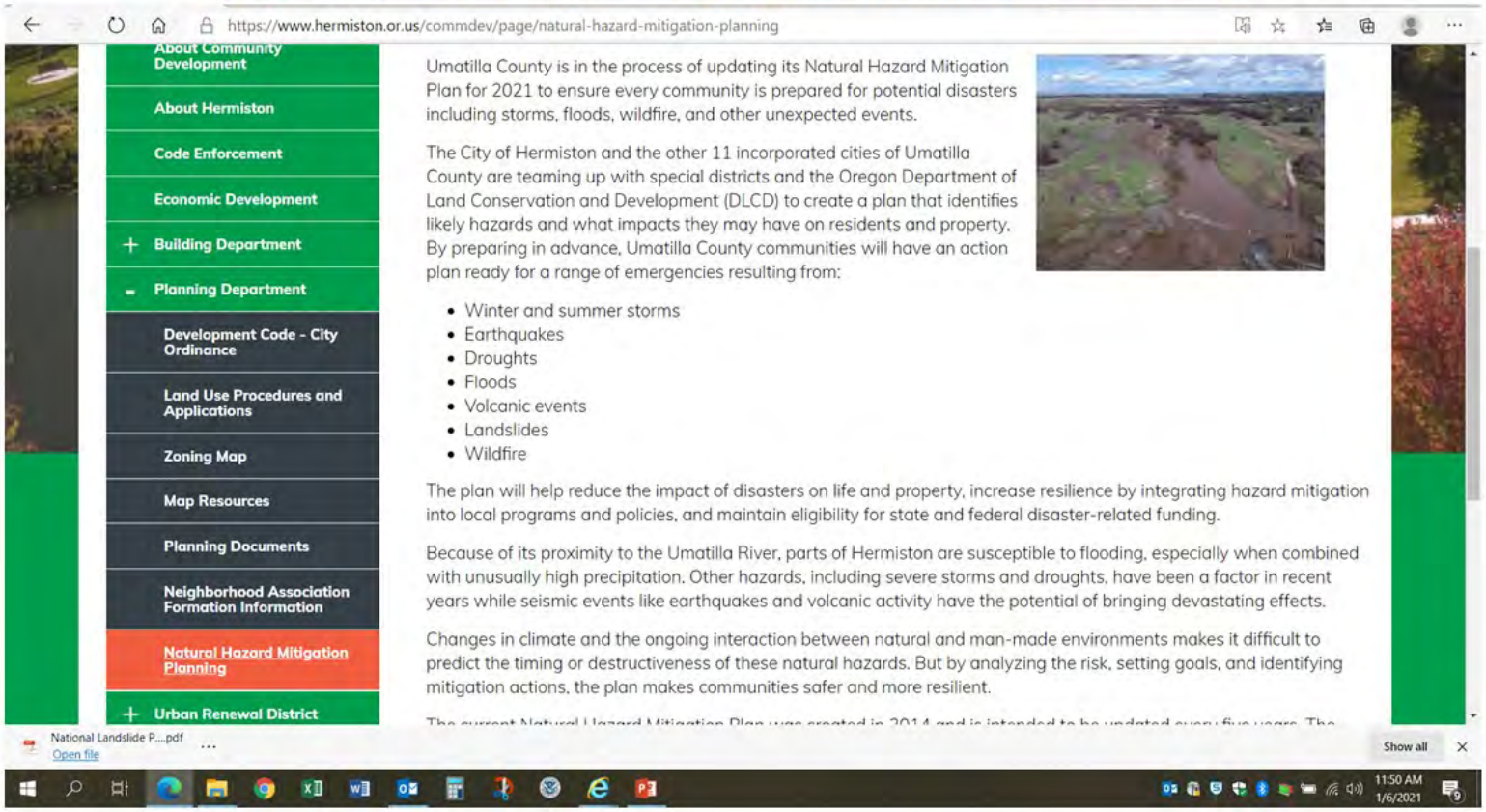

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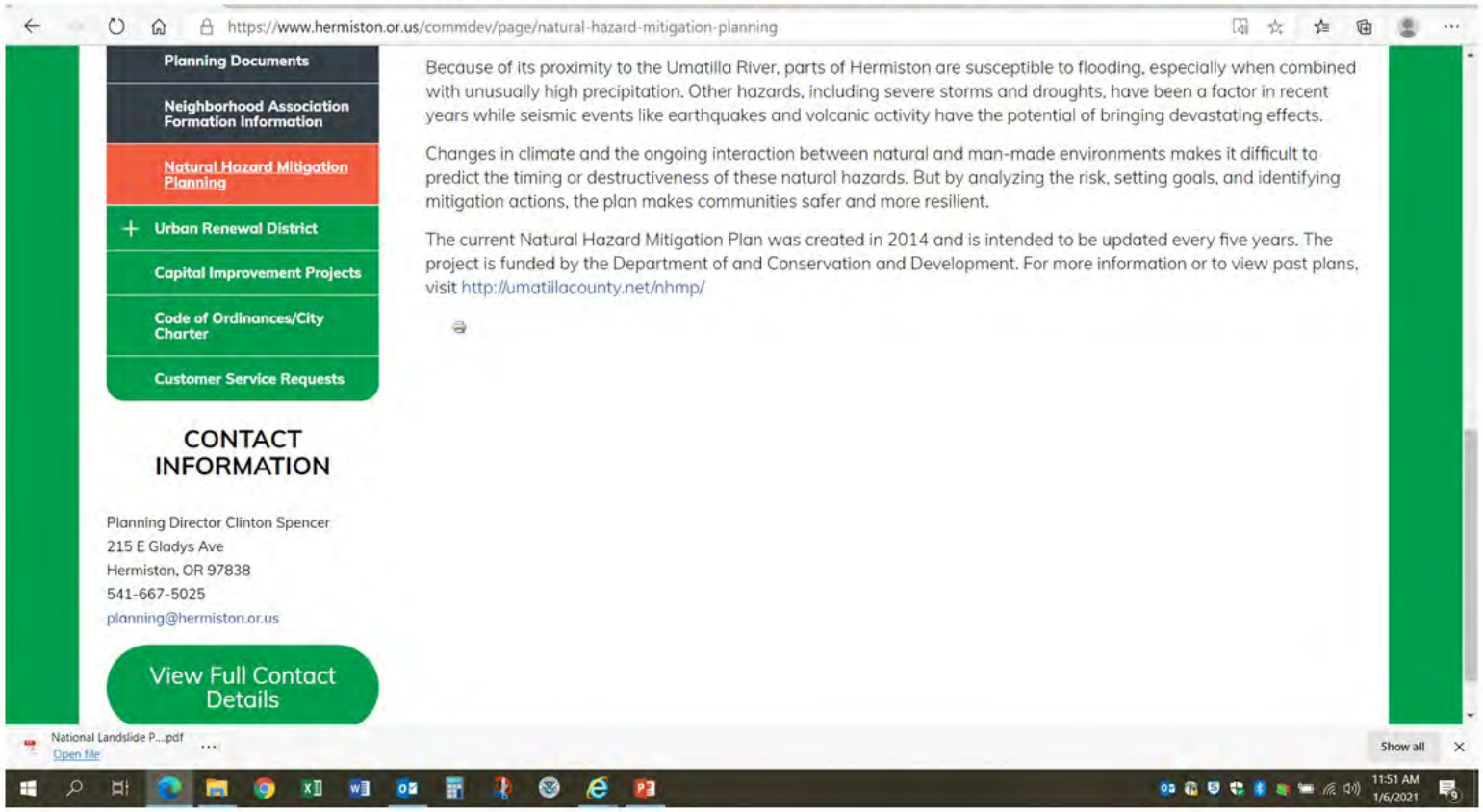
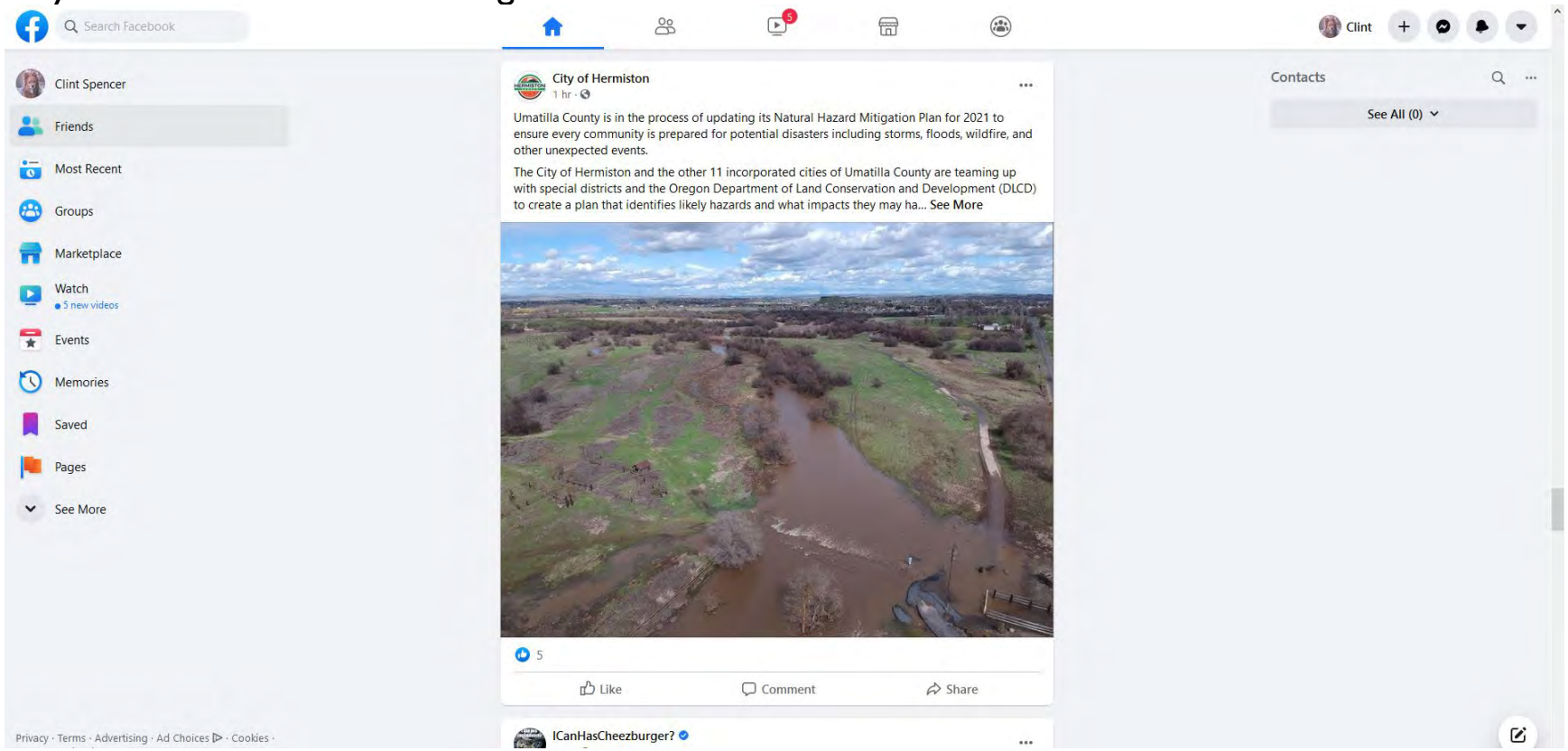


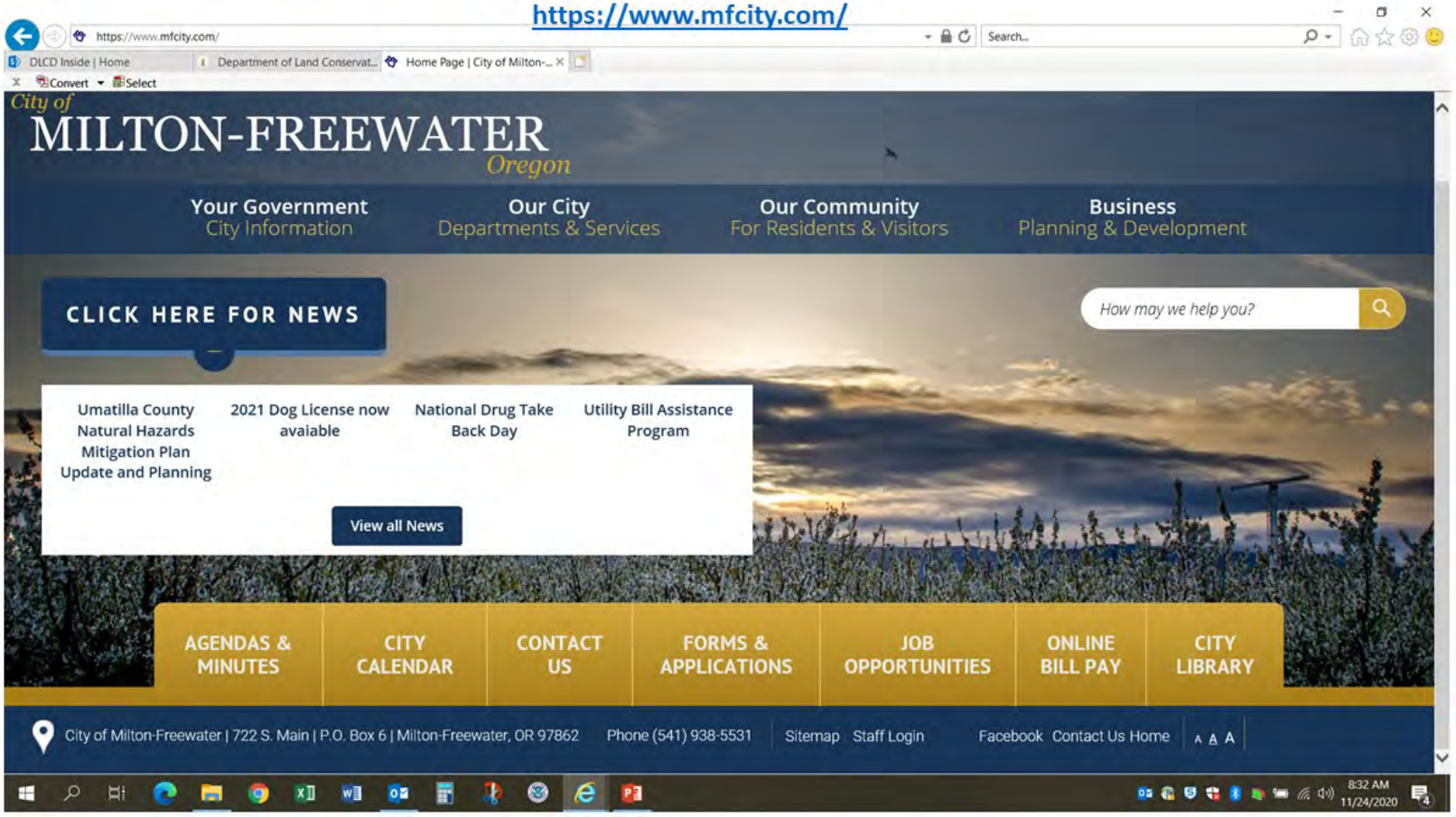
City of Hermiston Facebook Page 12/4/20



City of Pilot Rock Website 11/23/20

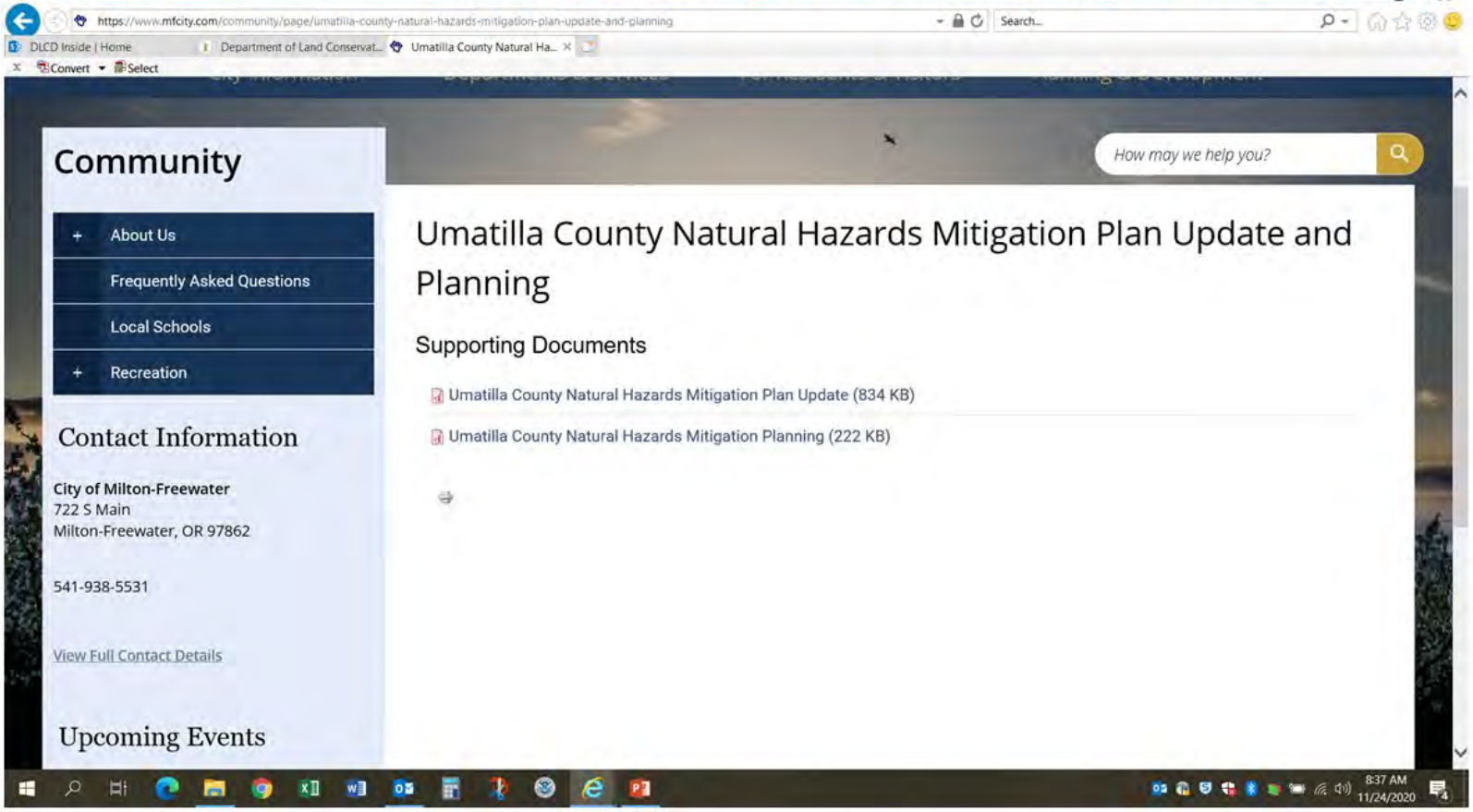
City of Milton-Freewater 11/24/20

https://www.mfcity.com/



City of Milton-Freewater 11/24/20

https://www.mfcity.com/community/page/umatilla-county-natural-hazards-mitigation-plan-update-and-planning



City of Adams, Newsletter October 2020

October 2020

Adams American

City Council News

Administrative

- The City obtained new address and zoning maps from Umatilla County to update our records and provide better service.
- We are looking into different on-line pay services which City residents can use to pay their water bills and other fees.
- The City has upgraded its Wi-Fi at the Library/City Hall. If your children are having trouble with online studies because of bad internet or no internet, they can bring their devices here to the library.

Maintenance

- Materials have been ordered to install a new hydrant near the skate park.
- Trenching has been completed on South Main for the installation of fiber optic cable for high speed internet.
- The swings are back up in the park.
- October19-20 will be the last meter reading for this fall. Please cleanout your meter boxes and pack them so they do not freeze this winter.
- The Wildhorse Creek Stabilization Project is finally done! We ask that people stay out of the area to allow the grass and plants to grow to help stabilize the soil over this coming winter.

Water

- The City has a permit to develop Well #4 but has not started the process. On September 18, 2020 there was a virtual meeting with the Councilors that could attend and several sources of potential funding. Several scenarios were discussed which would allow the City to develop a second well and improve the water service to Adams. Currently, Well #3 is the only water source for the City. There will be more details about this project after the next Council meeting.

Reminders-

- Thanks to everyone that bought their dog licenses and updated rabies certificates. There are still many dogs on record that have not been licensed. If you no longer have your pets, please let us know so we can update our records.
- Check your water meters to make sure they are not full of dirt or you will be billed an extra $10.00 per month.
- Make sure there is clear access to the water meter also or it is another $10.00.
- NO MOTORIZED VEHICLES-MOTORCYLES, FOUR WHEELERS, SIDE-BY-SIDES, OR DIRT BIKES ARE ALLOWED IN THE CITY PARK. Only approved ADA devices allowed.
- The Census people have brought to our attention that several residences do not have house numbers, or they are not visible. Having your house number clearly visible could save your life if law enforcement or Emergency Medical Services needs to

The City of Adams is partnering with Oregon Department of Land Conservation and Development and Umatilla County to create an updated Natural Hazard Mitigation Plan. The purpose of NHMP is to avoid natural disasters wherever possible, to help ensure the safety of our citizens and to retain eligibility for state and federal funding in the event of a disaster.

The attached flyer outlines the intent of the Plan.
The City invites your input or comments.
Email: cityofadams@wtechlink.us

November Elections are around the corner!

Don't forget to register to vote. You can go online and register using the Umatilla County website. Go to the elections department, it's that easy!

Candidates for Adams City Council are:

John Thompson-Position 3

Graham Alderson-Position 5

City of Adams website, 10/28/20

Umatilla County
Natural Hazards Mitigation Plan Update

UMATILLA COUNTY

About the Plan

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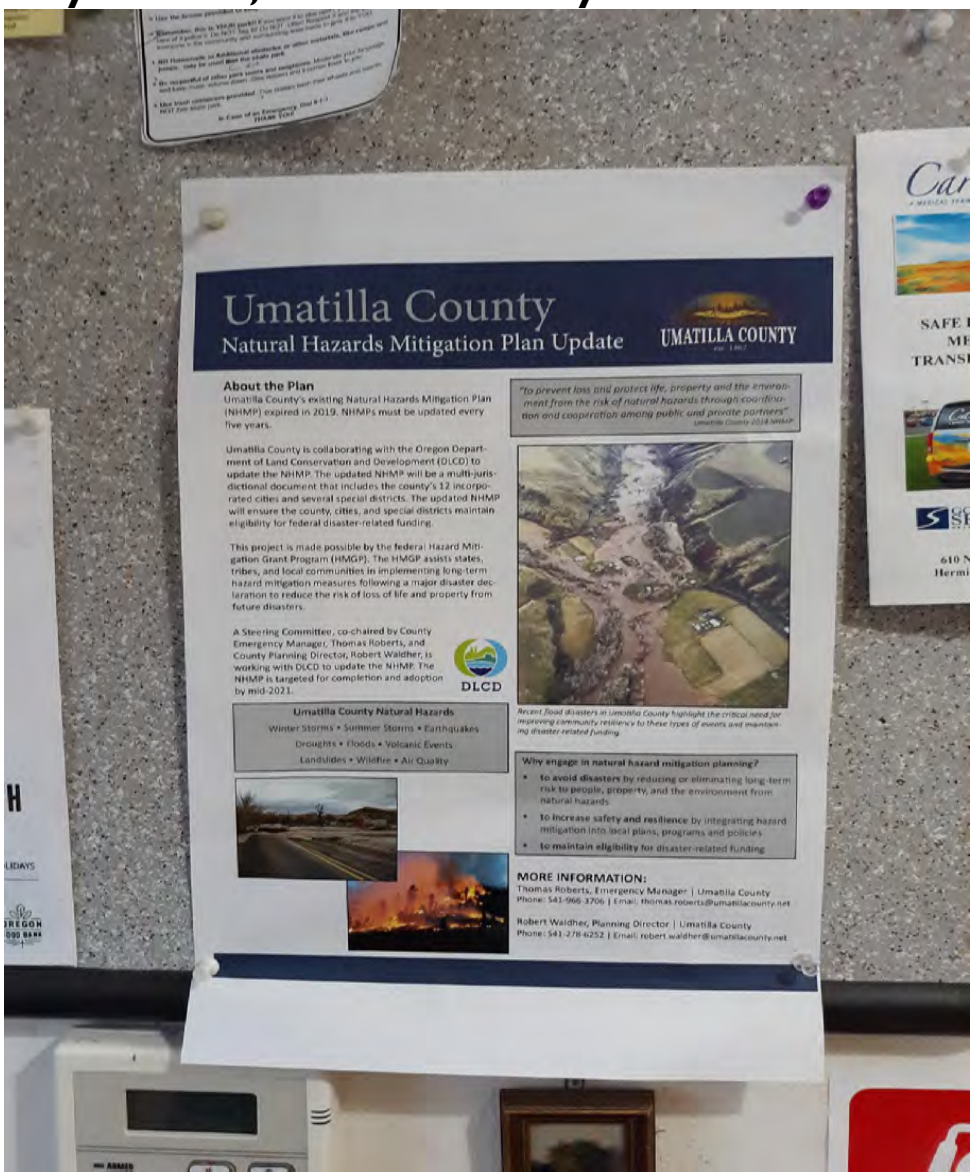
Phone: 541-966-3706 | Email: thomas.roberts@umatillacounty.net

Robert Waldher, Planning Director | Umatilla County
Phone: 541-278-6252 | Email: robert.waldher@umatillacounty.net

City of Echo, outreach at a café, 12/18/20

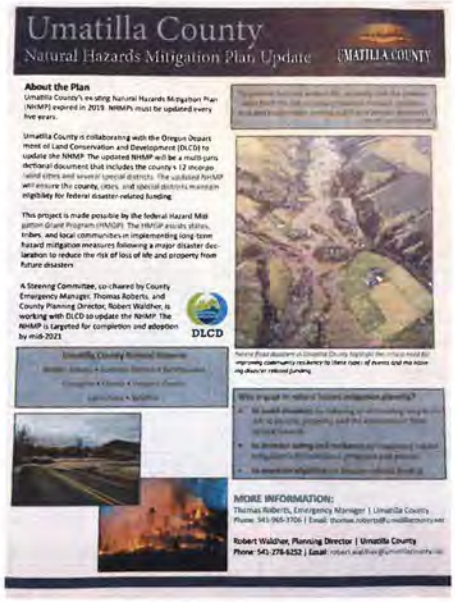
Source: Dave Slaght, City of Echo, personal communication, 12/18/20

City of Echo, outreach at City Hall and Post Office, 12/18/20



Source: Dave Slaght, City of Echo, personal communication, 12/18/20

City of Athena website, 10/8/20



Umatilla County Natural Hazards Mitigation Plan Update

The City of Athena is collaborating with DLCD, Umatilla County, and several cities, jurisdictions, and special districts in Umatilla County to update the Umatilla County Natural Hazards Mitigation Plan (NHMP) which is currently expired. A Natural Hazard Mitigation Plan described the hazards a community is most likely to face, identifies their potential impacts on people and property, and establishes a strategy to reduce those impacts. NHMP's that are current/valid provide the jurisdictions with eligibility for pre and post disaster funding. The

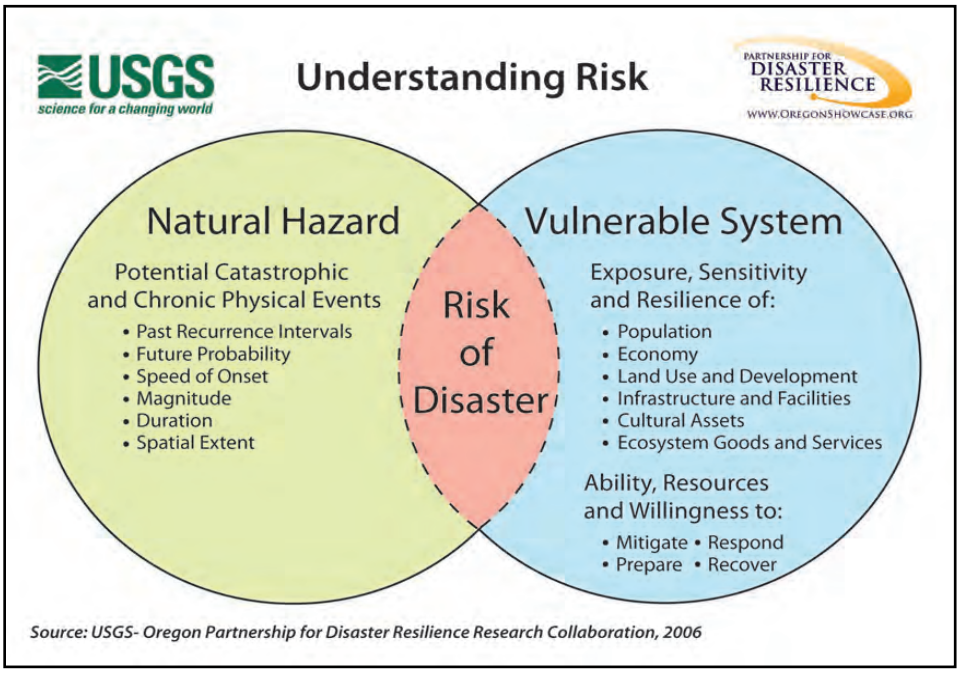
Appendix B:
Community Profile

Community resilience can be defined as the community's ability to manage risk and adapt to natural hazard impacts. It is the measure of the sustained ability of a community to use available resources to respond to, withstand, and recover from adverse situations.[1] The following capacities will be examined to help define and understand Umatilla County's, and the participating Cities' and Special Districts' resilience to natural hazards:

- Natural Environment
- Socio-Demographic Capacity
- Regional Economy
- Built (or Infrastructure)
- Community Connectivity
- Political Capital

The Community Profile provides a snapshot in time of the sensitivity and resilience factors in the county during the plan's most recent update. It assists in establishing mitigation actions and preparation for a more resilient community. The identification of mitigation actions that reduce sensitivity and exposure, and increase community resiliency, assists in reducing overall risk of disaster. See **Figure B-1**.

Figure B-1 Understanding Risk



Source: *2014 Umatilla County NHMP*, Oregon Partnership for Disaster Resilience

[1] Rand Corporation, *Community Resilience*, https://www.rand.org/topics/community-resilience.html

Natural Environment Capacity

Natural environment capacity is 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.[2] Natural resources such as wetlands and forested hill slopes play significant roles in protecting communities and the environment from natural hazards such as flooding and landslides. However, natural systems are often impacted or depleted by human activities adversely affecting community resilience.

Geography

Umatilla County, located near the northeast corner of Oregon, has a land area of 3,215 square miles, making it the eighth largest county in the state in terms of geographic area. It varies in width from 22 to 70 miles, and is approximately 70 miles in length from north to south. It is bounded on the west by Morrow County, on the south by Grant County, on the east by Wallowa and Union Counties, and on the north by Walla Walla and Benton Counties in the State of Washington.[3]

Private ownership is predominant in the Umatilla Basin, covering roughly 80 percent of the Basin land area (1,456,000 acres). The US Forest Service manages about 13 percent of the land area while approximately 12 percent lies within the boundaries of the Confederated Tribes of the Umatilla Indian Reservation. Agricultural and rangelands comprise more than 80 percent of the Basin area and the remainder consists of roughly 15 percent forest as well as 3 percent urban (the cities of Hermiston and Pendleton[4]) and other developed areas.[5]

A turbulent past created the land on which Umatilla now sits today. From about 16 million years ago to about 10 million years ago, massive volcanic eruptions spewed lava from fissures in the Earth's crust. About 300 separate lava flows poured out of the earth and cooled into basaltic rock during this time period. Since each flow ranged in thickness from 3 to 300 feet, the total thickness of all the flows is likely greater than 10,000 feet. These rocks, the remnants of those enormous eruptions, are collectively referred to as the Columbia River Basalts, or CRBs.

In the time between flows, weathering and erosion broke up the top layer of the hard, black basalt; as new flows surged over the old, they created layers of breccia, or rubbly, broken-up rock. Sedimentary deposits are present between some basalt flows. These layers were formed during periods of volcanic inactivity, when streams, lakes, and soil horizons formed on the basalt

[2] Mayunga, J. 2007, *Understanding and Applying the Concept of Community Disaster Resilience: A capital-based approach. Summer Academy for Social Vulnerability and Resilience Building*. https://www.u-cursos.cl/usuario/3b514b53bcb4025aaf9a6781047e4a66/mi_blog/r/11._Joseph_S._Mayunga.pdf

[3] FEMA, *Umatilla County Flood Insurance Study*, http://www.co.umatilla.or.us/planning/FIS/41059CV001A.pdf

[4] U.S. Census Bureau, 2010 Census, Oregon's 68 Urban Areas

[5] USDA, *Umatilla River Basin Total Maximum Daily Load and Water Quality Management Plan*, Oregon DEQ, http://www.ars.usda.gov/SP2UserFiles/person/6112/tmdl.pdf

surface (Oberlander, 1981). While the middle of each basalt flow is dense and transmits little water, the interflow zones of breccia and sediment formed productive aquifers.

Around the same time that the Columbia River Basalts were being formed, regional uplifting began creating the Blue Mountains. Basins and uplands began to form, rivers and streams began to run, and in some places, the running water left sands, gravels, and boulders, materials known as alluvium. These places, past riverbeds and flood deposits, are today's alluvial aquifers.

Columbia Basin

As can be seen in **Figure B-2** below, Umatilla County is mainly within the Columbia Basin physiographic province, though a substantial section of the county lies within the Blue Mountains in the East and South. Commonly referred to as the Deschutes-Columbia Plateau, the Columbia Basin is predominantly a volcanic province covering approximately 63,000 square miles in Oregon, Washington and Idaho.[6] The basin is surrounded on all sides by mountains, the Okanogan Highlands to the north, the Cascade Range to the west, the Blue Mountains to the south and the Clearwater Mountains to the east. Almost 200 miles long and 100 miles wide, the Columbia Basin merges with the Deschutes Basin lying between the High Cascades and Ochoco Mountains. The province slopes gently northward toward the Columbia River with elevations up to 3,000 feet along the south and west margins down to a few hundred feet along the river.[3]

Blue Mountains

The Blue Mountains range curves northeastward for 190 mi (310 km) from central Oregon to southeastern Washington. The range reaches a width of 68 miles and an average elevation of about 6,500 ft. (2,000 m); it comprises an uplifted, warped, and dissected lava plateau, above which rise several higher mountain ridges, including Aldrich, Strawberry, and Elkhorn. The highest peak is Rock Creek Butte (9,105 ft.), on the Elkhorn Ridge. The mountains are drained by tributaries of the Columbia River, and their slopes are heavily forested with pine and Douglas fir. The mountains are within parts of the Umatilla, Whitman, and Malheur national forests. [7]

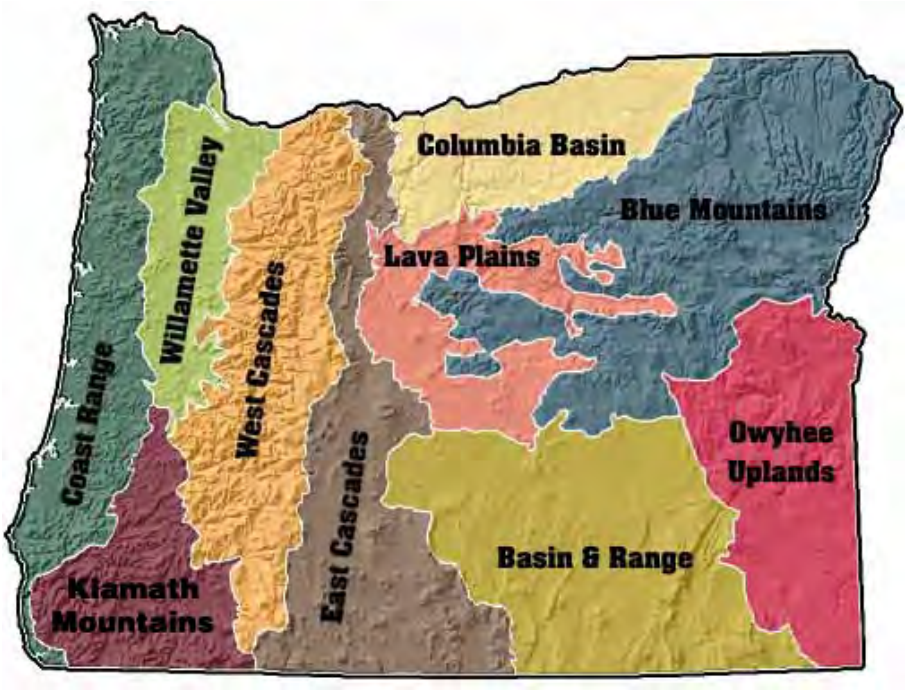
The Blue Mountains are a complex of mountain ranges that are lower and more open than the neighboring Cascades and Northern Rockies. Like the Cascades, but unlike the Northern Rockies, the Blue Mountains are mostly volcanic in origin. However, the core of the Blue Mountains and the highest ranges, the Wallowa and Elkhorn Mountains, are composed of granitic intrusive, deep sea sediments, and metamorphosed rocks.[8]

[6] Western Oregon University, *Oregon Physiographic Province,* Deschutes-Columbia Plateau, 1999. http://www.wou.edu/las/physci/taylor/eisi/orr_orr2.PDF

[7] Encyclopedia Britannica, http://www.britannica.com/EBchecked/topic/70305/Blue-Mountains

[8] Environmental Protection Agency, *Ecoregions of Oregon*, ftp://ftp.epa.gov/wed/ecoregions/or/or_front.pdf.

Figure B-2 Physiographic Provinces of Oregon



Source: Physiographic Provinces, Oregon Habitat Joint Venture, http://www.ohjv.org/projects.html

Level Four Ecoregions

"Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources; they are designed to serve as a spatial framework for the research, assessment management, and monitoring of ecosystem components. By recognizing the spatial differences in the capacities and potentials of ecosystems, ecoregions stratify the environment by its probable response to disturbance."[9] There are eight level four ecoregions within the Columbia Basin and Blue Mountains that can be found in Umatilla County; the Pleistocene Lake Basin, the Umatilla Plateau, the Yakima Folds, the Deep Loess Foothills, the Umatilla Dissected Uplands, the Maritime-Influenced Zone, the Mesic Forest Zone, and the Cold Basins.

Pleistocene Lake Basins
The Pleistocene Lake Basins once contained vast temporary lakes that were created by flood waters from glacial lakes Missoula and Columbia. In Oregon, the flood waters accumulated from the eastern entrance of the Columbia River Gorge upstream to the Wallula Gap to form ancient Lake Condon. Today, the region is the driest and warmest part of the Columbia Basin with mean annual precipitation varying from seven to ten inches. Native vegetation consists of bunchgrass and sagebrush. Major irrigation projects provide Columbia River water to this region, allowing the conversion of large areas into agriculture.

[9] Environmental Protection Agency, *Ecoregions of Oregon*, ftp://ftp.epa.gov/wed/ecoregions/or/or_front.pdf.

Umatilla Plateau[10]

The nearly level to rolling, treeless Umatilla Plateau ecoregion is underlain by basalt and veneered with loess deposits. Areas with thick loess deposits are farmed for dry land winter wheat, or irrigated alfalfa and barley. In contrast, rangeland dominates more rugged areas where loess deposits are thinner or nonexistent. Mean annual precipitation is nine to fifteen inches and increases with increasing elevation. In uncultivated areas, moisture levels are generally high enough to support grasslands of bluebunch wheatgrass and Idaho fescue without associated sagebrush.

Yakima Folds[11]

The Yakima Folds ecoregion consists of unforested anticlinal ridges composed of layer upon layer of basalt many thousands of feet thick. Loess blankets the south-facing slopes and supports dryland wheat farming. Steep, rocky north-facing slopes are commonly used for livestock grazing. The Ecoregion receives an average of ten to twelve inches of rain per year. Sagebrush and bunchgrass associations dominate plan assemblages outside of heavily farmed or grazed areas.

Deep Loess Foothills[12]

Highly-productive, loess-rich soils are found in the Deep Loess Foothills ecoregion. Moisture levels are high enough to support Idaho fescue and bluebunch wheatgrass grasslands. Today, the ecoregion is dominated by non-irrigated winter wheat, barley, alfalfa, and green pea farming. Land use contrasts with the rangeland of the Umatilla Dissected Uplands. Perennial streams occur that are fed by precipitation that falls on the adjacent Blue Mountains.

Umatilla Dissected Uplands[13]

The Umatilla Dissected Uplands ecoregion is where the dry grasslands of the Columbia Basin meet the forested Blue Mountains. The steep, dissected hills and terraced uplands are covered with Idaho fescue, bluebunch wheatgrass, and Sandberg bluegrass. Near the Blue Mountains, some north-facing slopes have Douglas-fir and ponderosa pine. The ecoregion is mostly used as rangeland because it lacks the thick, arable loess deposits that cover the agricultural Umatilla Plateau. Scablands, composed of arrays of earth mounds surrounded by rock polygons, are relics of Pleistocene glacial periods.

Maritime-Influenced Zone[14]

This is the portion of the Blue Mountains ecoregion that directly intercepts marine weather systems moving east through the Columbia River Gorge. In addition, loess and ash soils over basalt retain sufficient moisture to support forest cover at lower elevations than elsewhere in the Blue Mountains. A dense and diverse shrub layer grows beneath the relatively open

[10] Environmental Protection Agency, *Ecoregions of Oregon*, ftp://ftp.epa.gov/wed/ecoregions/or/or_front.pdf.

[11] Ibid.

[12] Ibid.

[13] Ibid.

[14] Ibid.

canopy of ponderosa pine and Douglas-fir which may delay tree regeneration following logging.

Mesic Forest Zone[15]
This disjunct ecoregion includes the highest forested areas in the western Wallowas and the Blue Mountains. The ecoregion is marine-influenced with higher precipitation than other forested Blue Mountains ecoregions. The ashy soil holds moisture during the dry season and supports a productive spruce-fir forest. The boundaries of the ecoregion correspond to the distribution of true fir forest before the modern era of fire suppression and high-grade logging.

Cold Basins[16]
This ecoregion contains high, wet meadows. The high meadows are often alluvial and have a high water table and silt or clay soils. Streams, if not channelized, are meandering and have a dynamic interaction with their flood plains. These unconstrained streams provide pool habitats that are important to salmonids. The short growing season and saturated soil make these basins unsuitable for most crops, except hay, but they are heavily grazed by cattle and elk.

Rivers

The Columbia River straddles about half of the county on its northwestern border. The Columbia River tributaries and main streams draining the area in the central and northwestern portions of the county are the Umatilla River, Birch Creek, East and West Forks Birch Creek, McKay Creek, Meacham Creek, Patawa Creek, Squaw Creek, Tutuilla Creek, and Wildhorse Creek.

The Walla Walla River is also a tributary of the Columbia River with sources in Umatilla County. Within the county, the river flows northwesterly to the city of Milton-Freewater and north to the Oregon-Washington State border line. Its tributaries include North and South Forks Walla Walla River, Pine Creek, and Mill Creek.[17]

Columbia River Basin
The Columbia River Basin is North America's fourth largest, draining a 259,000 square mile basin that includes territory in seven states (Oregon, Washington, Idaho, Montana, Nevada, Wyoming and Utah) and one Canadian province (British Columbia). The river flows for more than 1,200 miles, from the base of the Canadian Rockies in southeastern British Columbia to the Pacific Ocean at Astoria, Oregon, and Ilwaco, Washington. The Columbia River Basin includes a diverse ecology that ranges from temperate rain forests to semi-arid plateaus, with precipitation levels from six inches to 110 inches per year. Furthermore, the Columbia is a snow-charged river that seasonally fluctuates in volume. Its annual average discharge is 160 million acre-feet of water with the highest volumes between April and September and the lowest from December to February. From its source at 2,650

[15] Environmental Protection Agency, *Ecoregions of Oregon*, ftp://ftp.epa.gov/wed/ecoregions/or/or_front.pdf.

[16] Ibid.

[17] FEMA, *Umatilla County Flood Insurance Study*, http://www.co.umatilla.or.us/planning/FIS/41059CV001A.pdf

feet above sea level, the river drops an average of more than two feet per mile, but in some sections it falls nearly five feet per mile.[18]

The Columbia River Basin is the most hydroelectrically developed river system in the world.[19] The Federal Columbia River Power System (FCRPS) encompasses the operations of 14 major dams and reservoirs on the Columbia and Snake Rivers, operated as a coordinated system. In addition, the U.S. Army Corps of Engineers operates nine of 10 major federal projects on the Columbia and Snake Rivers. These federal projects are a major source of power in the region, providing flood control, navigation, recreation, fish and wildlife, municipal and industrial water supply, and irrigation benefits.[20]

Umatilla River

The Umatilla River Basin is located in the northeastern part of Oregon, in the Middle Columbia Basin, occupying approximately 2,500 square miles, and is the major drainage basin in Umatilla County. The Umatilla River, a tributary of the Columbia River, originates in the conifer forests of the Blue Mountains at over 6,000 feet elevation. The river flows west through the Umatilla Indian Reservation to Nolin, then northwest to Cottonwood Bend through the semi-arid shrub steppe of the Deschutes-Umatilla plateau. The river then flows north to its confluence with the Columbia River, entering at an elevation of 270 feet above sea level. This confluence occurs at the town of Umatilla, Oregon, about 300 miles upstream from the Pacific Ocean.[21]

The Umatilla River main stem begins at the confluence of its North and South Forks, forming an 89-mile reach of river that flows through a series of broad valleys that drain low rolling lands. The main stem Umatilla River has eight main tributaries: the North and South Forks of the Umatilla River and Meacham Creek in the upper sub-basin; Wildhorse, Tutuilla, McKay and Birch Creeks in the mid sub-basin; and Butter Creek in the lower sub-basin. These streams flow northerly and northwesterly. Wildhorse Creek, the only major north side tributary of the Umatilla River, flows southwesterly to its confluence with the Umatilla River. Much of the main stem and major tributaries have been straightened and or levied. [22]

Walla Walla River

The Walla Walla River Basin (WWRB) is located in southeast Washington and northeast Oregon. It is a fan-shaped basin encompassing 1,758 square miles. Of the total WWRB, 1,278 square miles or 73 percent is located in Washington, whereas 480 square miles or 27 percent is located in Oregon. The eastern one-fifth of the WWRB lies in the steep, lightly timbered western slopes of the Blue Mountains within the Umatilla National Forest. The remainder of the WWRB consists of moderate slopes and level terrain.

[18] Center for Columbia River History, Columbia River, Written by: *Bill Lang* Professor of History Portland State University, Former Director, Center for Columbia River History, http://www.ccrh.org/river/history.htm

[19] Ibid

[20] National Oceanic and Atmospheric Administration. Northwest Regional Office, *Columbia/Snake Basin*, http://www.nwr.noaa.gov/Salmon-Hydropower/Columbia-Snake-Basin/

[21] FEMA, *Umatilla County Flood Insurance Study*, http://www.co.umatilla.or.us/planning/FIS/41059CV001A.pdf

[22] USDA, *Umatilla River Basin Total Maximum Daily Load and Water Quality Management Plan*, Oregon DEQ, http://www.ars.usda.gov/SP2UserFiles/person/6112/tmdl.pdf

The WWRB is bordered by the Snake River Basin on the north, the Tucannon and Grande Ronde Basins to the east, and the Umatilla Basin to the south. The Walla Walla River originates in the Blue Mountains at an elevation of nearly 6,500 feet and flows through narrow, well-defined canyons. After it flows out of the mountains, it goes through broad valleys that drain to low, rolling lands.[23]

Current and Projected Climate

The climate of Umatilla County is characterized by light to moderate precipitation and an extreme range in temperature. In general, the climate is subject to the moderating influence of the prevailing westerly flow of maritime air from the Pacific Ocean, but occasional influxes of polar air masses cause brief periods of extremely cold temperatures. Record extreme temperatures within the county are 119°F at Pendleton and -52°F at Meacham. The Rocky Mountains partly shield the Umatilla Basin from strong arctic winds, so winters generally are cold but not severe. In summer, the Cascade Range inhibits winds from over the Pacific Ocean to the west. Days are hot, but nights are fairly cool.[24]

Umatilla County has a continental climate with a winter precipitation pattern. Precipitation levels vary from 8-10 inches along the Columbia River, to as high as 60 inches in the higher elevations of the Blue Mountains. Peak flows in the Umatilla River normally occur in the spring with high elevation snow melt, and diminish throughout the summer to the lows in August or September. The seasonal distribution of precipitation is similar to that generally observed over the interior in the Pacific Northwest, the greater portion falling during the winter.[25]

There are many potential hazards that can occur within Umatilla County; however certain types are more frequent due to Umatilla County's geography. A history of weather emergencies within the region has consistently represented a primary threat to the county's populations and natural resources. Umatilla County has suffered severe winter storms, which can result in power outages and disrupt transportation. Some areas of the county are subject to risk from avalanche, though these areas are primarily in the high country of the Blue Mountains and pose minimal risk to most of the population. Umatilla County has also suffered from periods of drought in the past, as well as from wind storms and tornadoes. Wind storms can occur suddenly and can cause damage to homes and property and disrupt vital utilities. Tornadoes periodically touch down in Umatilla County but they have not been known to cause major damage.

Other weather-related hazards in Umatilla County include fire and flooding. Wildfire is less of a risk in most of Umatilla County compared to other parts of Oregon due to large areas of farm and rangeland, though approximately 12% of the county consists of forest land that constitutes a significant threat for forest fires, as do rapidly burning grassland and field fires across the county. While flooding may be less of risk than in other parts of the state, Umatilla County has experienced several significant flood events just within the last two years on a number of rivers and creeks that pass through the county. In this *2021 Umatilla County NHM*P, the Risk Assessment in Volume I Section 2 provides a description of the identified natural hazards for Umatilla County; the hazards are discussed in detail in their respective individual hazard annexes in Volume II.

[23] *Walla Walla River Watershed Study Reconnaissance Report*, http://www.nww.usace.army.mil/planning/er/studies/WWRBASIN/default.htm#2.01

[24] USDA, *Umatilla River Basin Total Maximum Daily Load and Water Quality Management Plan*, Oregon DEQ, http://www.ars.usda.gov/SP2UserFiles/person/6112/tmdl.pdf

[25] FEMA, *Umatilla County Flood Insurance Study*, http://www.co.umatilla.or.us/planning/FIS/41059CV001A.pdf

Localized climate projections for the regions within Oregon must be developed; these localized assessments are essential for both the public and private sectors to respond to climate change.[26] See **Appendix E** for the *Future Climate Projections* report produced by the Oregon Climate Change Research Institute (OCCRI). The information is specific to Umatilla County. In addition to describing the current climate, the following sections discuss climate projections for the Pacific Northwest.

In the *2020 Oregon NHMP*, the U.S. EPA's ecoregions are used to describe areas of ecosystem similarity. Also within the *2020 Oregon NHMP*, Oregon's Natural Hazard Regions are identified as 1 through 8. Region 5 is composed of Gilliam, Hood River, Morrow, Sherman, Umatilla, and Wasco Counties. Region 5 has four ecoregions: the Blue Mountains, the Cascades, the Eastern Cascades Slope and Foothills, and predominantly, the Columbia Plateau.

The ecoregions have diverse ecoregions with varying climatic conditions. The region is subject to droughts, floods, landslides, wind storms, winter storms, volcanic events, earthquakes, and wildfires. All of these natural hazards, with the addition of and air quality, are identified in Umatilla County's Hazard Vulnerability Assessment (HVA).

The *Fourth Oregon Climate Assessment Report: State of Climate Science: 2019* provides a comprehensive assessment of the state of climate change as it pertains to Oregon. It covers the physical, biological, and social dimensions. In summary, it notes the following assessments:

- Oregon is already experiencing statewide impacts of a changing climate.
- Oregon continues to warm in all seasons, in part due to human activity.
- Warming is projected to continue in all seasons, dependent on global activity.
- Changes in rainfall will accentuate extremes.
- Sea level rise projections have not changed substantially through mid-century, though estimates of the maximum plausible sea level by the end of the century (2100) have increased to 8.2 feet.
- Hot days will become more frequent in Oregon in a changing climate.
- Nearly every location in Oregon has seen a decline in spring snowpack, and it will continue to significantly decline through mid-century, especially at lower elevations.
- Fire activity is strongly linked to summer climate, with the largest fires occurring exclusively in warm and dry summers.
- Climate change may also present a potential opportunity to adapt to a rapidly changing Oregon.[27]

Volume II: Hazard Annexes contains hazard-specific information. The Introduction to Volume II briefly includes climate information and describes the HVA; the full description of the HVA is in Volume I Section 2. Climate data such as precipitation, temperature, and sunshine is presented below and provides a framework for understanding the climate in Umatilla County.

[26] The Governor's Climate Change Integration Group, *A Framework for Addressing Rapid Climate Change*, 2008, http://www.oregon.gov/ENERGY/gblwrm/docs/ccigreport08web.pdf, p 8.

[27] OCCRI, *Fourth Oregon Climate Assessment Report: State of Climate Science: 2019, http://www.occri.net/publications-and-reports/fourth-oregon-climate-assessment-report-2019/*.

Precipitation, Rainfall, and Snowfall

The average annual precipitation is comparable at different NOAA stations throughout Umatilla County. Precipitation includes snowfall unless otherwise specified.

Table B-1 shows the monthly average and the annual average precipitation for four geographic areas in Umatilla County. These geographic areas include west Umatilla County (Echo, Stanfield, Hermiston, and Umatilla), central Umatilla County (Pendleton, Pilot Rock), south Umatilla County (Ukiah), and northeast Umatilla County (Helix, Adams, Athena, Weston, and Milton-Freewater).

Table B-1 Average Precipitation (Inches) for Areas in Umatilla County

Month	West Umatilla County	Central Umatilla County	South Umatilla County	Northeast Umatilla County
January	1.34	1.43	1.79	1.73
February	0.94	1.11	1.25	1.42
March	1.11	1.32	1.46	1.85
April	1.03	1.20	1.55	1.58
May	0.91	1.35	1.82	1.80
June	0.69	0.98	1.44	1.24
July	0.27	0.32	0.65	0.44
August	0.33	0.38	0.62	0.52
September	0.50	0.57	0.70	0.71
October	0.79	1.01	1.32	1.13
November	1.20	1.52	2.11	2.08
December	1.33	1.47	2.09	1.96
Annual	0.87	1.06	1.40	1.37

Source: NOAA Centers for Environmental Information, Data Tools: 1981-2010 Normals, https://www.ncdc.noaa.gov/cdo-web/datatools/normals, accessed 02/01/21

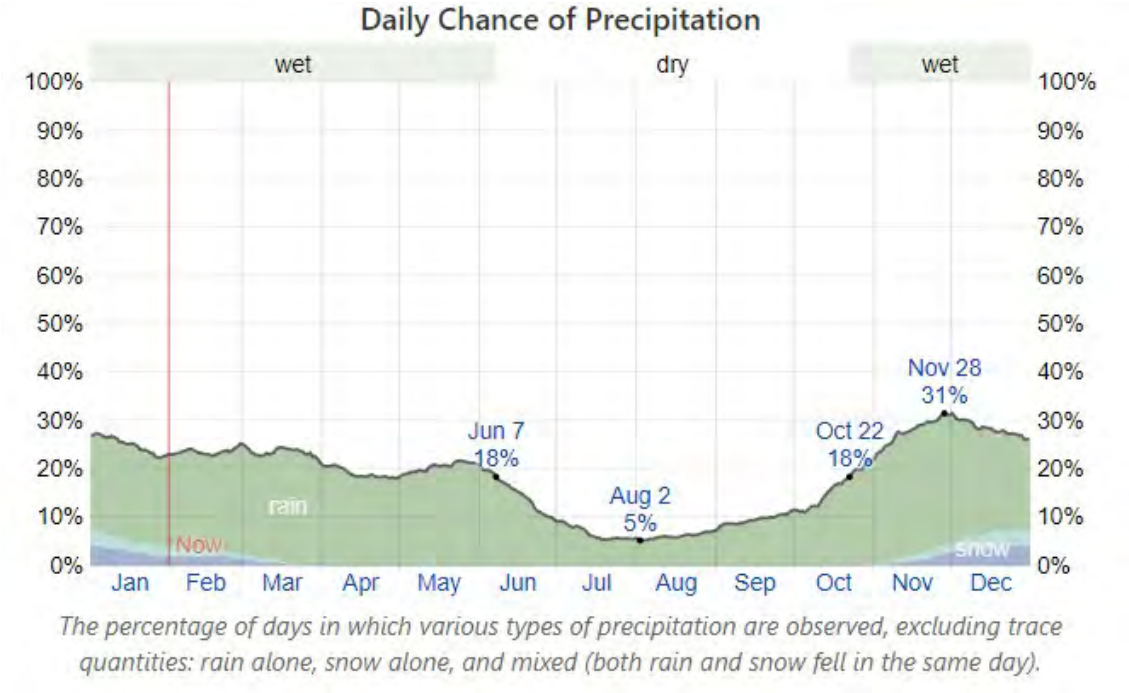
Precipitation

Figure B-3 shows the average daily chance of precipitation throughout the year in Pendleton. A wet day is one with at least 0.04 inches of liquid or liquid-equivalent precipitation. The chance of wet days in Pendleton varies throughout the year. The wetter season lasts 7.5 months, from October 22

to June 7, with a greater than 18% chance of a given day being a wet day. The chance of a wet day peaks at 31% on November 28. The drier season lasts 4.5 months, from June 7 to October 22. The smallest chance of a wet day is 5% on August 2.

Among wet days, we distinguish between those that experience rain alone, snow alone, or a mixture of the two. Based on this categorization, the most common form of precipitation throughout the year is rain alone, with a peak probability of 27% on November 28. [28]

Figure B-3 Daily Chance of Precipitation in Inches



The percentage of days in which various types of precipitation are observed, excluding trace quantities: rain alone, snow alone, and mixed (both rain and snow fell in the same day).

Source: Weather Spark, *Average Weather in Pendleton, OR,* https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

Rainfall

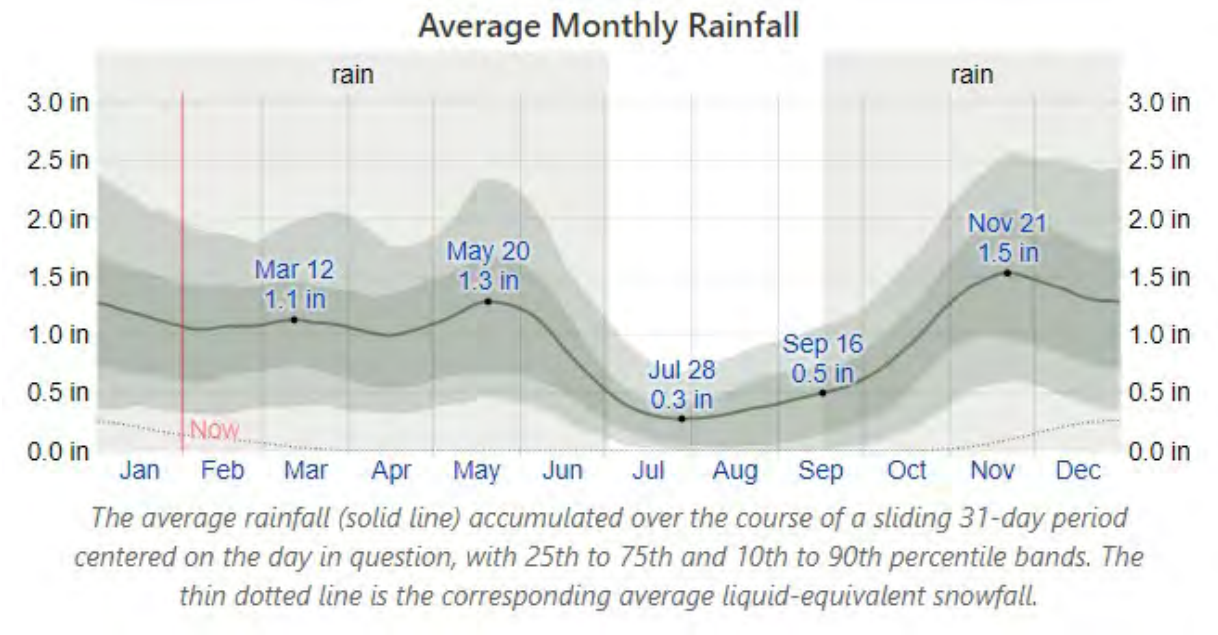
To show variation within the months and not just the monthly totals, we show the rainfall accumulated over a sliding 31-day period centered around each day of the year. Pendleton experiences some seasonal variation in monthly rainfall.

The rainy period of the year lasts for 9.5 months, from September 16 to July 2, with a sliding 31-day rainfall of at least 0.5 inches. The most rain falls during the 31 days centered around November 21, with an average total accumulation of 1.5 inches.

[28] Weather Spark, *Average Weather in Pendleton, OR,* https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

The rainless period of the year lasts for 2.5 months, from July 2 to September 16. The least rain falls around July 28, with an average total accumulation of 0.3 inches.[29] **Figure B-4** shows the average monthly rainfall throughout the year in Pendleton.

Figure B-4 Average Monthly Rainfall (inches)



Source: Weather Spark, *Average Weather in Pendleton, OR,* https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

According to the *Future Climate Projections* report for Umatilla County, the intensity of extreme precipitation events is expected to increase in the future as the atmosphere warms and is able to hold more water vapor. In Umatilla County, the frequency of days with at least 3⁄4" of precipitation is not projected to change substantially. However, the magnitude of precipitation on the wettest day and wettest consecutive five days per year is projected to increase on average by about 19% (with a range of 7% to 39%) and 14% (with a range of -1% to 32%), respectively, by the 2050s under the higher emissions scenario relative to the historical baselines. The frequency of days with at least ¾" of precipitation and the frequency of days exceeding a threshold for landslide risk is not projected to change substantially.[30]

Snowfall

We report snowfall in liquid-equivalent terms. The actual depth of new snowfall is typically between 5 and 10 times the liquid-equivalent amount, assuming the ground is frozen. Colder, drier snow tends to be on the higher end of that range and warmer, wetter snow on the lower end.

As with rainfall, we consider the snowfall accumulated over a sliding 31-day period centered around each day of the year. Pendleton experiences some seasonal variation in monthly liquid-equivalent snowfall. Southern Umatilla County as well as areas near the foothills of the Blue Mountains,

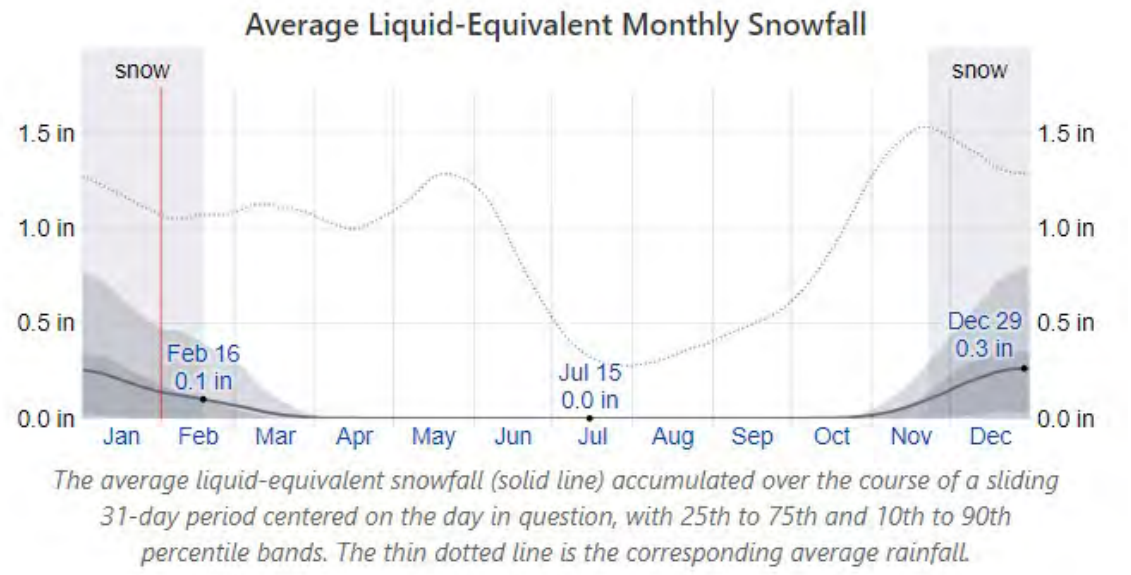
[29] Weather Spark, *Average Weather in Pendleton, OR,* https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

[30] OCCRI, *Future Climate Projections Umatilla County*, October 2020.

including the cities of Weston, Athena, and Adams, typically experience higher snow amounts than central and west Umatilla County.

The snowy period of the year for Pendleton lasts for 2.8 months, from November 22 to February 16, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around December 29, with an average total liquid-equivalent accumulation of 0.3 inches. The snowless period of the year lasts for 9.2 months, from February 16 to November 22. The least snow falls around July 15, with an average total liquid-equivalent accumulation of 0.0 inches. [31] **Figure B-5** shows the average monthly snowfall throughout the year in Pendleton.

Figure B-5 Average Liquid-Equivalent Monthly Snowfall



Source: Weather Spark, *Average Weather in Pendleton, OR,* https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

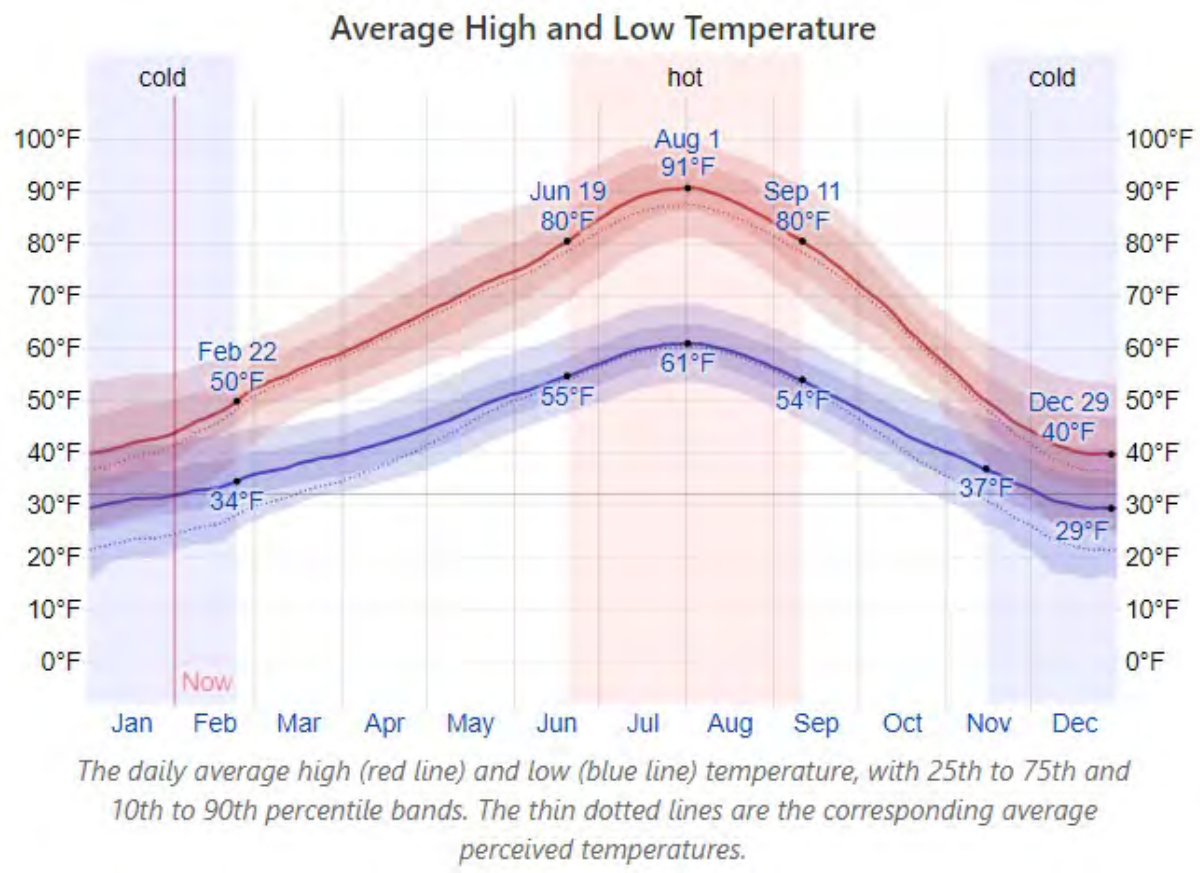
Temperature

Temperatures vary only slightly throughout most of Umatilla County, with the exception of southern Umatilla County, which is typically cooler. The hot season lasts for 2.7 months, from June 19 to September 11, with an average daily high temperature above 80°F. The hottest day of the year is August 1, with an average high of 91°F and low of 61°F. The cold season lasts for 3.2 months, from November 15 to February 22, with an average daily high temperature below 50°F. The coldest day of the year is December 29, with an average low of 29°F and high of 40F.[32] **Figure B-6** shows the average high and low temperature throughout the year in Pendleton.

[31] Weather Spark, *Average Weather in Pendleton, OR,* https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

[32] Ibid.

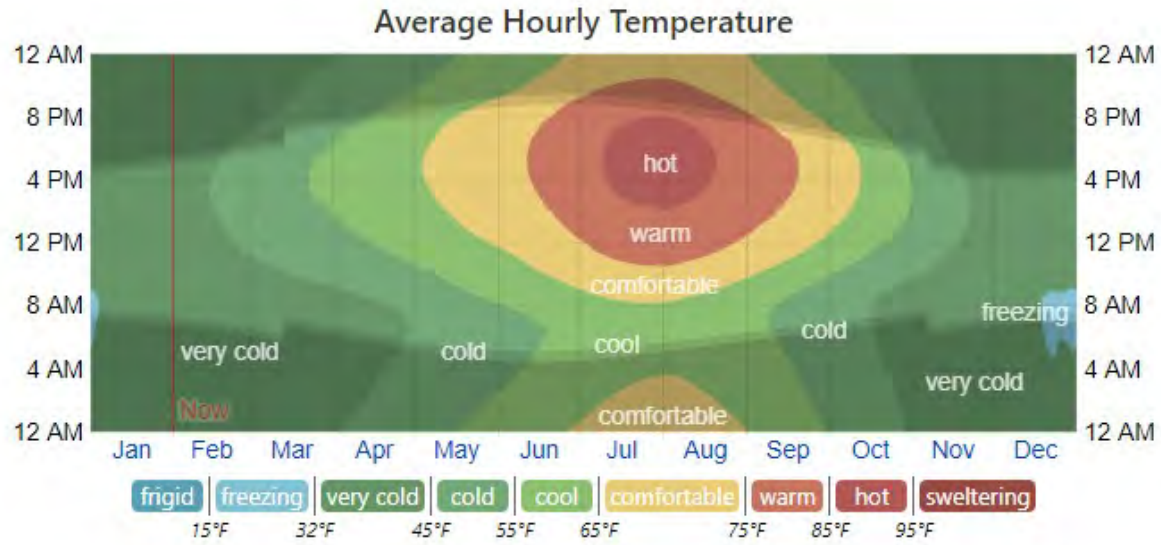
Figure B-6 Average High and Low Temperature in Pendleton, Oregon



Source: Weather Spark, *Average Weather in Pendleton, OR*, https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

Figure B-7 shows a compact characterization of the entire year of hourly average temperatures. The horizontal axis is the day of the year, the vertical axis is the hour of the day, and the color is the average temperature for that hour and day.

Figure B-7 Average Hourly Temperature in Pendleton, Oregon



The average hourly temperature, color coded into bands. The shaded overlays indicate night and civil twilight.

Source: Weather Spark, *Average Weather in Pendleton, OR,* https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

Table B-2 shows the monthly average temperature and **Table B-3** shows the minimum/maximum temperatures for four geographic areas in Umatilla County. These geographic areas include west Umatilla County (Echo, Stanfield, Hermiston, and Umatilla), central Umatilla County (Pendleton, Pilot Rock), south Umatilla County (Ukiah), and northeast Umatilla County (Helix, Adams, Athena, Weston, and Milton-Freewater).

Table B-2 Average Temperature (Degrees F) for Areas in Umatilla County

Month	West Umatilla County	Central Umatilla County	South Umatilla County	Northeast Umatilla County
January	34.9	35.3	27.0	36.4
February	37.8	38.5	30.4	39.9
March	45.5	45.1	37.1	47.7
April	51.7	50.7	42.3	53.5
May	59.7	57.8	48.7	60.4
June	66.3	64.9	55.4	67.2
July	73.6	72.6	61.5	74.9

August	72.0	71.8	60.7	74.0
September	63.0	63.4	53.1	65.2
October	50.8	51.9	44.5	53.9
November	40.5	41.3	34.8	42.8
December	33.1	33.2	27.0	34.5
Annual	52.4	52.2	43.5	58.4

Source: Source: NOAA Centers for Environmental Information, Data Tools: 1981-2010 Normals, https://www.ncdc.noaa.gov/cdo-web/datatools/normals, accessed 02/01/21

Table B-3 Min/Max Temperature (Degrees F) for Areas in Umatilla County

Month	West Umatilla County	Central Umatilla County	South Umatilla County	Northeast Umatilla County
January	27.6 / 42.3	28.8 / 41.8	15.6 / 38.4	29.5 / 43.2
February	27.3 / 48.2	30.3 / 46.8	17.2 / 43.6	31.9 / 47.9
March	32.8 / 58.1	35.0 / 55.2	23.8 / 50.4	38.0 / 56.8
April	37.4 / 66.0	39.2 / 62.1	27.1 / 57.4	42.9 / 64.1
May	44.9 / 74.5	45.6 / 70.0	33.1 / 64.4	48.9 / 71.9
June	51.3 / 81.3	51.5 / 78.2	38.0 / 72.8	54.9 / 79.5
July	56.8 / 90.5	57.2 / 88.0	40.7 / 82.3	61.0 / 88.8
August	54.9 / 89.1	56.8 / 86.8	38.0 / 83.4	60.2 / 87.8
September	46.4 / 79.6	49.4 / 77.4	30.8 / 75.4	52.4 / 78.1
October	36.3 / 65.2	40.1 / 63.7	25.9 / 63.1	42.7 / 65.0
November	31.2 / 49.9	33.4 / 49.2	22.8 / 46.9	34.9 / 50.7
December	26.1 / 40.0	27.0 / 39.5	16.5 / 37.5	27.9 / 41.1
Annual	39.41 / 65.4	41.2 / 63.2	27.5 / 59.6	43.7 / 64.6

Source: NOAA Centers for Environmental Information, Data Tools: 1981-2010 Normals, https://www.ncdc.noaa.gov/cdo-web/datatools/normals, accessed 02/01/21

According to the *Future Climate Projections* report for Umatilla County, the frequency of hot days per year with temperatures at or above 90°F is projected to increase on average by 29 days, with a

range of about 11 to 41 days, by the 2050s under the higher emissions scenario relative to the historical baselines. This average increase represents a more than doubling of hot days relative to the average historical baseline. The temperature of the hottest day of the year is projected to increase on average by nearly 8°F, with a range of about 3 to 11°F, by the 2050s under the higher emissions scenario relative to the historical baselines.[33]

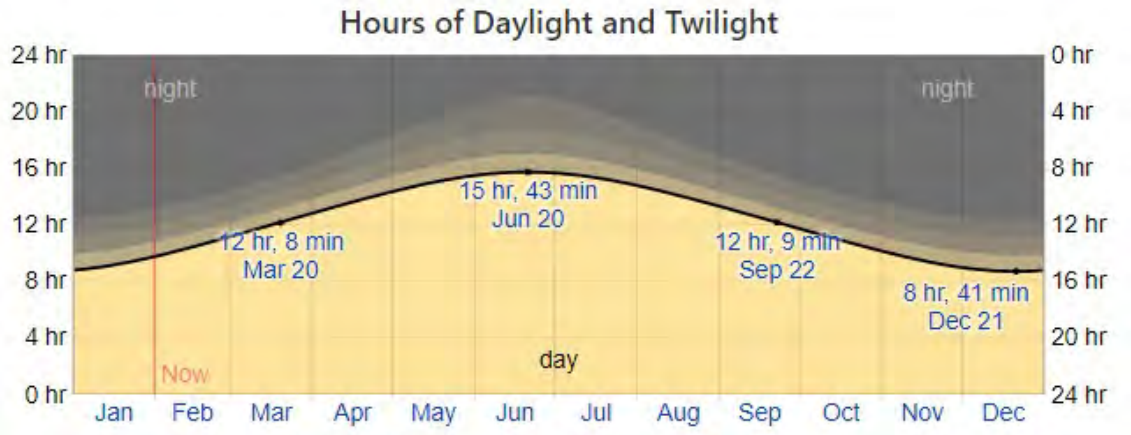
Cold extremes are still expected to occur from time to time, but with much less frequency and intensity as the climate warms.

In Umatilla County, the frequency of cold days per year at or below freezing is projected to decrease on average by 11 days, with a range of about 5 to 17 days, by the 2050s under the higher emissions scenario relative to the historical baselines. This average decrease represents a future with a little more than half as many cold days per year as in the average historical baseline. The temperature of the coldest night of the year is projected to increase on average by about 9°F, with a range of about 0 to 17°F, by the 2050s under the higher emissions scenario relative to the historical baselines. [34]

Sun

The length of the day in Umatilla County varies significantly over the course of the year. In 2020, the shortest day is December 21, with 8 hours, 41 minutes of daylight; the longest day is June 20, with 15 hours, 43 minutes of daylight.[35] **Figure B-8** shows the hours of daylight and twilight throughout the year in Pendleton.

Figure B-8 Hours of Daylight and Twilight in Pendleton, Oregon



The number of hours during which the Sun is visible (black line). From bottom (most yellow) to top (most gray), the color bands indicate: full daylight, twilight (civil, nautical, and astronomical), and full night.

Source: Weather Spark, *Average Weather in Pendleton, OR,* https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

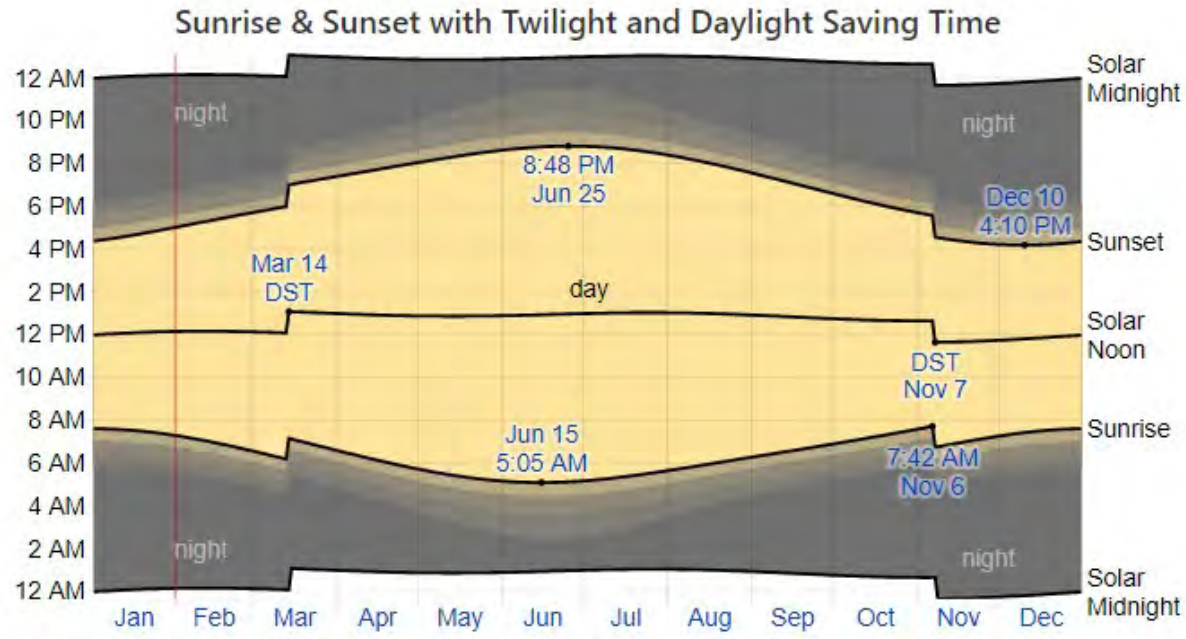
[33] OCCRI, *Future Climate Projections Umatilla County*, October 2020.

[34] Ibid.

[35] Weather Spark, *Average Weather in Pendleton, OR,* https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

The earliest sunrise is at 5:05 AM on June 15, and the latest sunrise is 2 hours, 9 minutes later at 7:42 AM on November 6. The earliest sunset is at 4:10 PM on December 10, and the latest sunset is 4 hours, 38 minutes later at 8:48 PM on June 25. Daylight saving time (DST) is observed in Pendleton during 2021, starting in the spring on March 14, lasting 7.8 months, and ending in the fall on November 7.[36] **Figure B-9** shows the sunrise and sunset throughout the year in Pendleton.

Figure B-9 Sunrise and Sunset with Twilight and Daylight Savings Time in November



The solar day over the course of the year 2021. From bottom to top, the black lines are the previous solar midnight, sunrise, solar noon, sunset, and the next solar midnight. The day, twilights (civil, nautical, and astronomical), and night are indicated by the color bands from yellow to gray. The transitions to and from daylight saving time are indicated by the 'DST' labels.

Source: Weather Spark, *Average Weather in Pendleton, OR,* https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

Wind

This section discusses the wide-area hourly average wind vector (speed and direction) at 10 meters above the ground. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages.

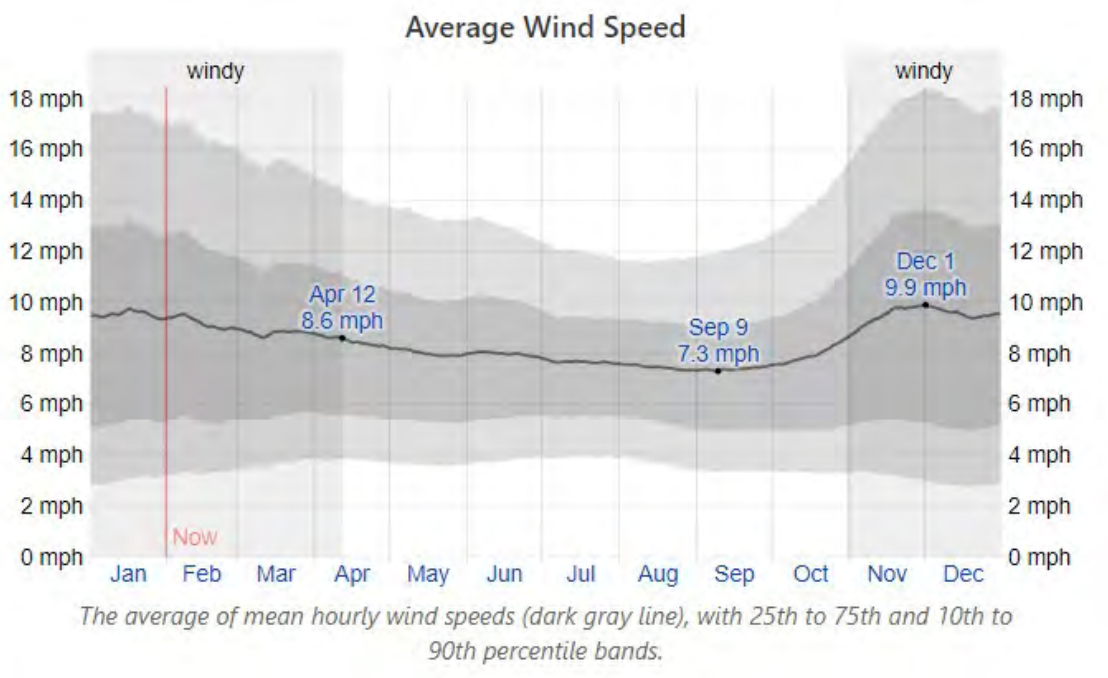
The average hourly wind speed in Pendleton experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 5.4 months, from October 30 to April 12, with

[36] Ibid.

average wind speeds of more than 8.6 miles per hour. The windiest day of the year is December 1, with an average hourly wind speed of 9.9 miles per hour.

The calmer time of year lasts for 6.6 months, from April 12 to October 30. The calmest day of the year is September 9, with an average hourly wind speed of 7.3 miles per hour.[37] **Figure B-10** shows the average wind speed in November in Pendleton.

Figure B-10 Average Wind Speed in November



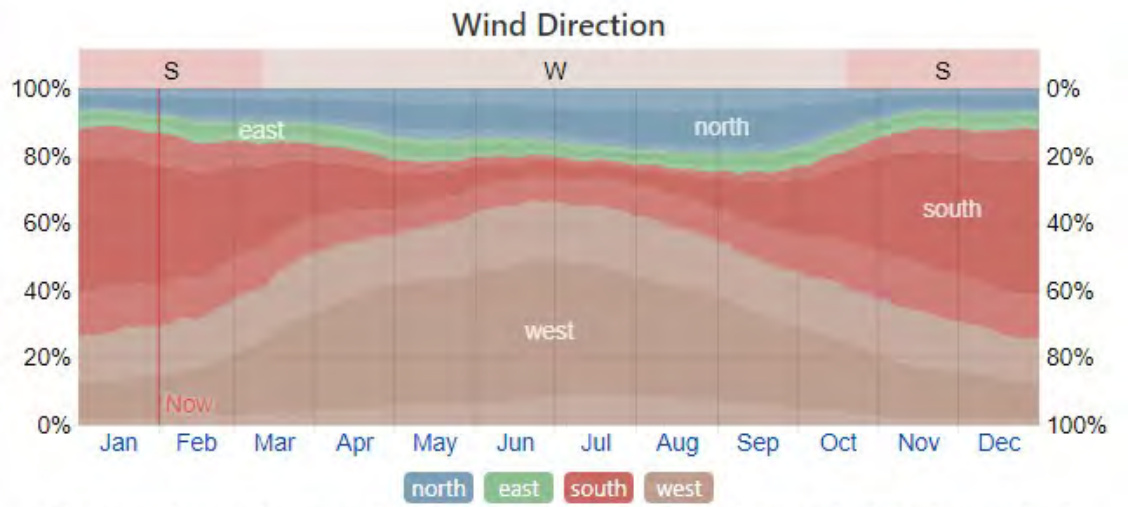
Source: Weather Spark, *Average Weather in Pendleton, OR,* https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

The predominant average hourly wind direction in Pendleton varies throughout the year. The wind is most often from the west for 7.2 months, from March 12 to October 19, with a peak percentage of 67% on June 21. The wind is most often from the south for 4.8 months, from October 19 to March 12, with a peak percentage of 62% on January 1. [38] **Figure B-11** shows the typical wind direction in November in Pendleton.

[37] Ibid.

[38] Ibid.

Figure B-11 Wind Direction in November



The percentage of hours in which the mean wind direction is from each of the four cardinal wind directions, excluding hours in which the mean wind speed is less than 1.0 mph. The lightly tinted areas at the boundaries are the percentage of hours spent in the implied intermediate directions (northeast, southeast, southwest, and northwest).

Source: Weather Spark, *Average Weather in Pendleton, OR*, https://weatherspark.com/y/1781/Average-Weather-in-Pendleton-Oregon-United-States-Year-Round, accessed 01/31/21.

Hazard Severity

As part of the HMGP grant for this NHMP update, the Department of Land Conservation and Development (DLCD) contracted with the Oregon Climate Change Research Institute (OCCRI) to provide an analysis of climate change influences on natural hazards. The collaboration resulted in products which provide information regarding the influence and impacts of climate change on existing natural hazards events such as but not limited to heavy rains, river flooding, droughts, heat waves, cold waves, wildfire, and air quality. The details of this information are provided in Appendix E Future Climate Projections Reports: *Future Climate Projections: Umatilla County*

Table HA-2 provides an overview of expected climate change impacts for Umatilla County. The table shows the direction of change (increasing, decreasing, unchanging) and indicates the level of confidence in direction of change (high, medium, low).

According to the OCCRI report:

- There is very high confidence that heat waves will increase and that cold waves will decrease.
- There is high confidence heavy rains, wildfire, flooding, and loss of wetlands will increase.
- There is medium confidence that droughts and prevalence of invasive species will increase.
- There is low confidence that wind storms will remain unchanged, dust storms will decrease, and poor air quality will increase.

The overview describes results for the natural hazards using climate metrics in summary and as a comparison. For more information see the OCCRI reports in Appendix E. Of note, the climate metrics used by OCCRI do not exactly match the natural hazards identified by Umatilla County.

Synthesis

The physical geography, weather, climate, and land cover of an area are interrelated systems that affect overall risk and exposure to natural hazards. Climate change variability also has the potential to increase the effects of hazards. These factors combined with a growing population 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. Climate change is further discussed as part of the Risk Assessment in Volume I Section2, throughout Volume 2 in the Introduction and the Hazard Annexes, and in the OCCRI reports in **Appendix E**.

Socio Demographic Capacity

Socio demographic capacity characterizes the community population in terms of language, race and ethnicity, age, income, educational attainment, and health. These attributes can significantly influence the community's ability to cope, adapt to, and recover from natural disasters. In addition to those described, the current status of other socio demographic capacity indicators in such as graduation rate, quality of schools, median household income can have long term impacts on the Umatilla County economy and stability of the community ultimately affecting future resilience. These factors that are vulnerabilities can be reduced with outreach and mitigation planning.

Population

Umatilla County's total population as of 2020 was 81,495 residents. **Table B-4** illustrates the number of people living in Umatilla County and the surrounding counties of Morrow, Grant, Union, Wallowa, Benton (Washington), and Walla Walla (Washington) 1980 to 2020. The population of Umatilla County rose 7.2% from 1980 to 2020.

Table B-4 Population of Umatilla County and Adjacent Counties

County	2020	2010	2000	1990	1980
Umatilla	81,495	75,889	70,548	59,249	58,861
Morrow	12,825	11,173	10,995	7,625	7,519
Grant	7,315	7,445	7,935	7,853	8,210
Union	26,840	25,748	24,530	23,598	23,921
Wallowa	7,160	7,008	7,226	6,911	7,273
Benton (WA)	207,494	175,177	142,475	113,507	109,444
Walla Walla (WA)	60,905	58,781	55,180	48,505	47,435

Source: U.S. Census Bureau, Umatilla, Morrow, Grant, Union, Wallowa, Walla Walla and Benton County, accessed 01/28/21.

As shown above, Umatilla County's total population has grown steadily since 2000, with average annual growth rates near one percent between 2000 and 2010; however, some of its sub-areas experienced more rapid population growth during the 2000s. Hermiston, the most populous UGB,

and Umatilla UGB posted the highest average annual growth rates at 2.1 and 2.8 percent, respectively, during the 2000 to 2010 period. [39]

Table B-5 Change in Umatilla County Population

Incorporated City	% Change	2020	2010	2000	1990	1980
Adams	2.7	375	350	297	223	240
Athena	4	1,170	1,026	1,221	997	965
Echo	2.9	720	699	650	500	624
Helix	8.1	200	184	183	150	155
Hermiston	11.8	18,775	16,745	13,154	10,047	8,408
Milton-Freewater	2.3	7,210	7,050	6,470	5,533	5,086
Pendleton	2.5	17,025	16,612	16,354	15,142	14,521
Pilot Rock	0	1,505	1,502	1,532	1,478	1,630
Stanfield	11.5	2,280	2,043	1,979	1,568	1,568
Ukiah	29.7	240	186	255	250	249
Umatilla	10.1	7,605	6,906	4,978	3,046	3,199
Weston	3	690	667	717	606	719
Unincorporated	7.2	23,700	21,919	22,758	19,709	21,497

Source: Oregon Blue Book. County-City Population Change, https://sos.oregon.gov/blue-book/Pages/local/county-population.aspx, accessed 01/28/21.

Umatilla County's positive population growth in the 2000s was the result of a steady natural increase and periods of substantial net in-migration. A larger number of births relative to deaths led to a natural increase (more births than deaths) in every year from 2000 to 2015. While net in-migration fluctuated dramatically during the early and middle years of the last decade, the number of in-migrants has been slightly more stable during recent years, contributing to a population increase. Even so the natural increase continues to account for most of the population growth. [40]

Total population in Umatilla County as a whole as well as within its sub-areas will likely grow at a slightly faster pace in the near-term (2016 to 2035) compared to the long-term (2035-2066). The tapering of growth rates is driven by an aging population—a demographic trend which is expected to contribute to an increase in deaths. Even so, natural increase is expected to persist, combining with steady in-migration for continued strong population growth. Umatilla County's total population is forecast to increase by nearly 13,300 over the next 19 years (2016- 2035) and by close to 36,800 over the entire 50-year forecast period (2016-2066). All sub-areas are expected to experience population growth during the forecast period. [41]

Figure B-27 Umatilla County Population Density shows that the most densely populated areas are in the northwest and northeast portions of the county. The least densely populated areas are through the central and southern portions of the county.

[39] Portland State University Population Research Center, *Coordinated Population Forecast for Umatilla County, its Urban Growth Boundaries (UGBs), and Area Outside UGBs 2018-2068*, dated 6/30/18.

[40] Ibid.

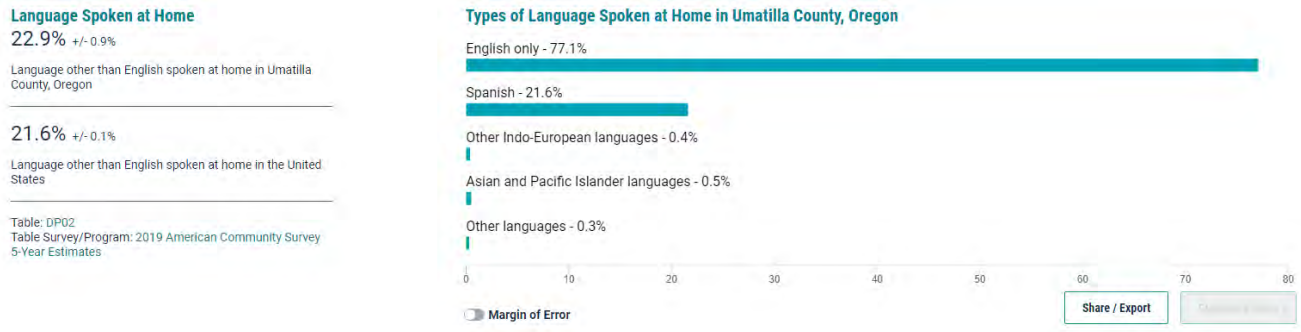
[41] Ibid.

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.[42]

English is the predominant language in Umatilla County; about 77% of the population speaks English as their primary language. Among the 22.9 percent whose primary language is not English, 21.6% speak Spanish. See **Figure B-12**. The population would benefit from specialized emergency and mitigation hazard planning outreach, with attention to cultural, visual and technology sensitive materials.[43]

Figure B-12 Language Spoken at Home in Umatilla County, OR



Source: U.S. Census Bureau, Umatilla County, https://data.census.gov/cedsci/profile?g=0500000US41059, accessed 01/12/21

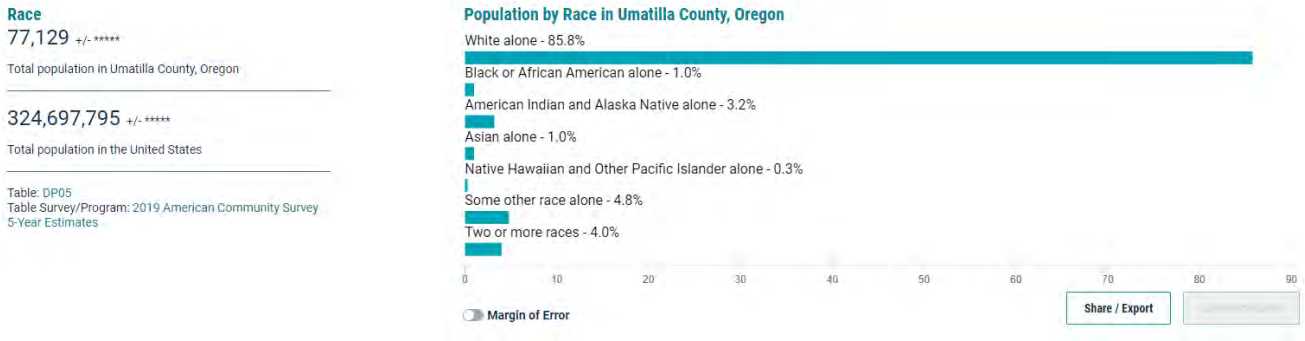
Race

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. **Figure B-13** describes Umatilla County's population by race and ethnicity.

[42] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, Region 5 Risk Assessment, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_11_RA5.pdf

[43] U.S. Census Bureau, Umatilla County, https://data.census.gov/cedsci/profile?g=0500000US41059, accessed 01/12/21

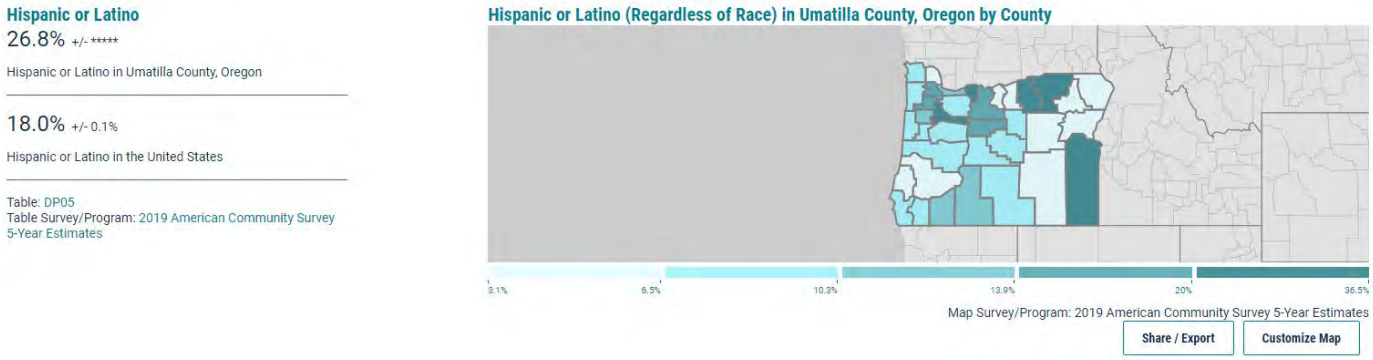
Figure B-13 Race and Ethnicity in Umatilla County, OR



Source: U.S. Census Bureau, Umatilla County, https://data.census.gov/cedsci/profile?g=0500000US41059, accessed 01/12/21

Approximately 14.2% of residents identified as a race other than white on the 2010 Census, and nearly 27% identified as Hispanic or Latino. It will be important to identify specific ways to support all of the community, especially Hispanics and Latinos through hazard preparedness and response.

Figure B-14 Hispanic or Latino in Umatilla County, OR



Source: U.S. Census Bureau, Umatilla County, https://data.census.gov/cedsci/profile?g=0500000US41059, accessed 01/12/21

Age

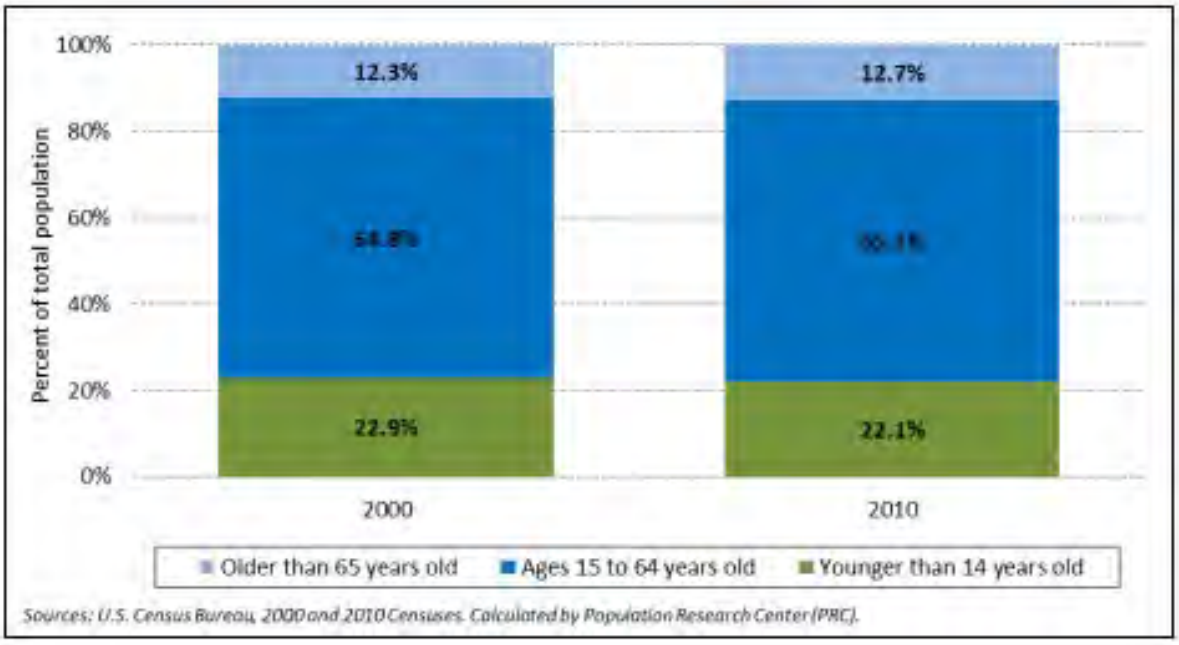
The age profile of an area has a direct impact on what actions are prioritized for mitigation and how response to hazards is carried out. School age children rarely make decisions about emergency management. Therefore, a larger youth population increases the importance of outreach to schools and parents on effective ways to teach children about fire safety, flood response, and evacuation plans. Children are more vulnerable to the heat and cold, have few transportation options, and require assistance to access medical facilities.[44] Older populations may have special needs prior to, during, and after a natural disaster. For example, they may require assistance in evacuation due to limited mobility or health issues. They may require special medical equipment or medications, and can lack the social and economic resources needed for post-disaster recovery.[45]

[44] DLCD, *2015 Oregon Natural Hazards Mitigation Plan*, Region 6 Central Oregon Regional Profile, https://www.oregon.gov/lcd/NH/Documents/Approved_2015ORNHMP_12_RA6.pdf

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

Umatilla County's population is aging, but at a much slower pace compared to most areas across Oregon. An aging population significantly influences the number of deaths, but also yields a smaller proportion of women in their childbearing years, which may result in a decline in births. For Umatilla County the decline in the population of women at childbearing ages has not been true. Births have actually increased, in spite of the slight rise in the proportion of county population 65 or older between 2000 and 2010. Further underscoring Umatilla County's modest trend in aging, the median age went from about 35 in 2000 to 36 in 2010, an increase that is half of what is observed statewide and in many cases a quarter of the increase in age seen in many of Oregon's counties over the same time period. The shifts in the age structure are shown in **Figure B-15**.[46]

Figure B-15 Umatilla County, OR – Age Structure of the Population 2000 and 2010



Source: Portland State University Population Research Center, *Coordinated Population Forecast for Umatilla County, its Urban Growth Boundaries (UGBs), and Area Outside UGBs 2018-2068*, dated 6/30/18.

The most significant indicator that influences socio-demographic capacity in Umatilla County may be the age dependency ratio of the population. The dependency ratio is a generalized analytical tool that evaluates the population under the age of 15 and over the age of 64. The 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. The dependency ratio indicates a higher percentage of dependent aged people to that of working age. **Figure B-15** shows Umatilla County has an age dependent population around 35%.

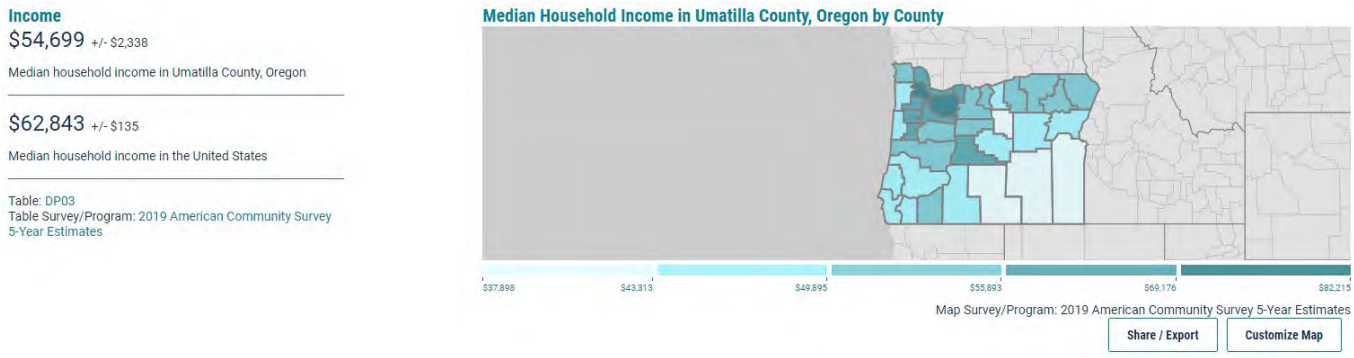
[46] Portland State University Population Research Center, *Coordinated Population Forecast for Umatilla County, its Urban Growth Boundaries (UGBs), and Area Outside UGBs 2018-2068*, dated 6/30/18.

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.[47]

The median household income in Umatilla County is $54,699. This amount is about 13 percent lower than the median household income for the U.S. See **Figure B-16**. [48]

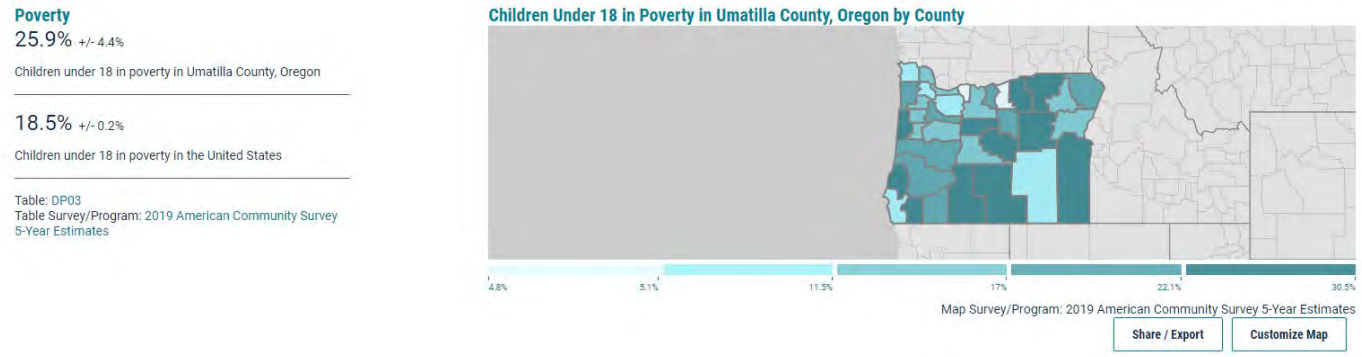
Figure B-16 Income and Poverty in Umatilla County, OR



Source: U.S. Census Bureau, Umatilla County, https://data.census.gov/cedsci/profile?g=0500000US41059, accessed 01/12/21

Figure B-17 identifies the percentage of children under 18 that are below the poverty level in 2019 as 25.9%. This is substantially higher than the percentage of children under the age of 18 below the poverty level in the U.S. which is 18.5%.

Figure B-17 Children Under 18 in Poverty in Umatilla County, OR



Source: U.S. Census Bureau, Umatilla County, https://data.census.gov/cedsci/profile?g=0500000US41059, accessed 01/12/21

Rural counties tend to have a lower per capita personal income (PCPI) than urban counties. The per capita income is the total personal income in an area divided by the population. Wages and salaries are typically the largest source of personal income. Area with large youth populations or large

[47] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, Region 5 Risk Assessment, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_11_RA5.pdf

[48] U.S. Census Bureau, Umatilla County, https://data.census.gov/cedsci/profile?g=0500000US41059, accessed 01/12/21

retirement populations have lower per capita income because a larger share of their population isn't working and earning income.[49]

Table B-6 Per Capita Personal Income in Metro and Non-Metro Areas in Oregon and the U.S. 2015

Per Capita Personal Income in Metro and Nonmetro Areas in Oregon and the U.S., 2015

	Total	Metro	Nonmetro
Per capita personal income			
United States	$48,112	$49,827	$37,866
Oregon	$43,783	$45,040	$37,332
Per capita net earnings			
United States	$30,729	$32,260	$21,584
Oregon	$26,467	$27,911	$19,058
Per capita transfer receipts			
United States	$8,334	$8,118	$9,624
Oregon	$8,861	$8,406	$11,196
Per capita dividends, interest, and rent			
United States	$9,049	$9,449	$6,658
Oregon	$8,455	$8,723	$7,078

Source: U.S. Bureau of Economic Analysis

Source: Oregon Employment Department, *The Employment Landscape of Rural Oregon*, May 2017, https://www.qualityinfo.org/documents/10182/13336/The+Employment+Landscape+of+Rural+Oregon?version=1.0

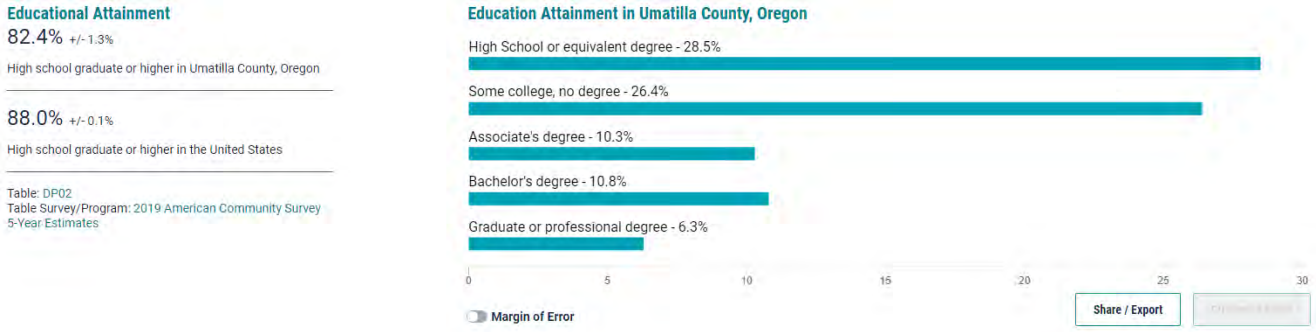
Income is a resiliency indicator, as higher incomes are often associated with increased self-reliance, and ability to prepare oneself if an emergency does occur. The higher the poverty rate, the more assistance the community will likely need in the event of a disaster in the form of sheltering, medical assistance, and transportation. Higher income populations often have less mobility following significant hazard events because their assets may be rooted in the local community and lower income members of the population may find it easier to relocate.

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.

[49] Source: Oregon Employment Department, *The Employment Landscape of Rural Oregon*, May 2017, https://www.qualityinfo.org/documents/10182/13336/The+Employment+Landscape+of+Rural+Oregon?version=1.0

Figure B-18 Educational Attainment in Umatilla County, OR



Source: U.S. Census Bureau, Umatilla County, https://data.census.gov/cedsci/profile?g=0500000US41059, accessed 01/12/21

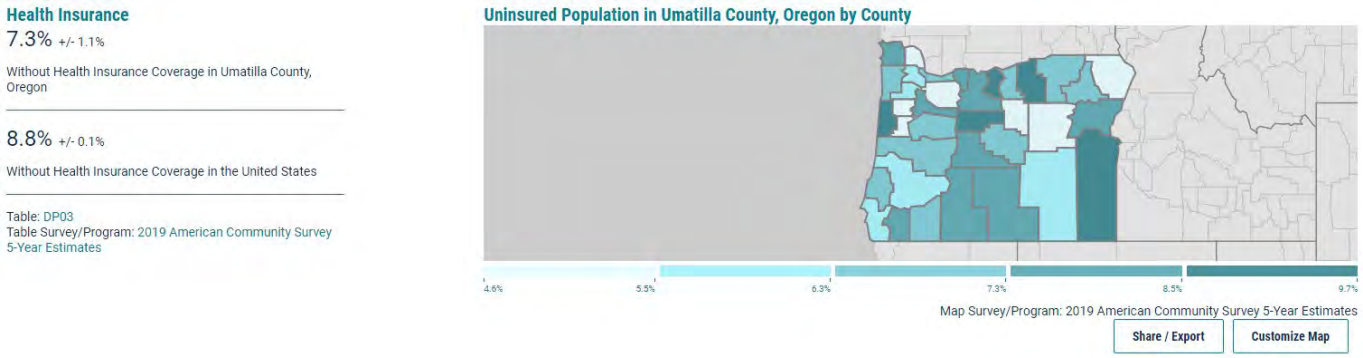
According to the U.S. Census, 82.4% of the Umatilla County population over 18 years of age has graduated from high school or received a high school equivalency, with 10.3% receiving an associate college degree and 10.8% receiving a bachelor's degree. Approximately 6% of Umatilla County residents have obtain a graduate or professional degree.

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

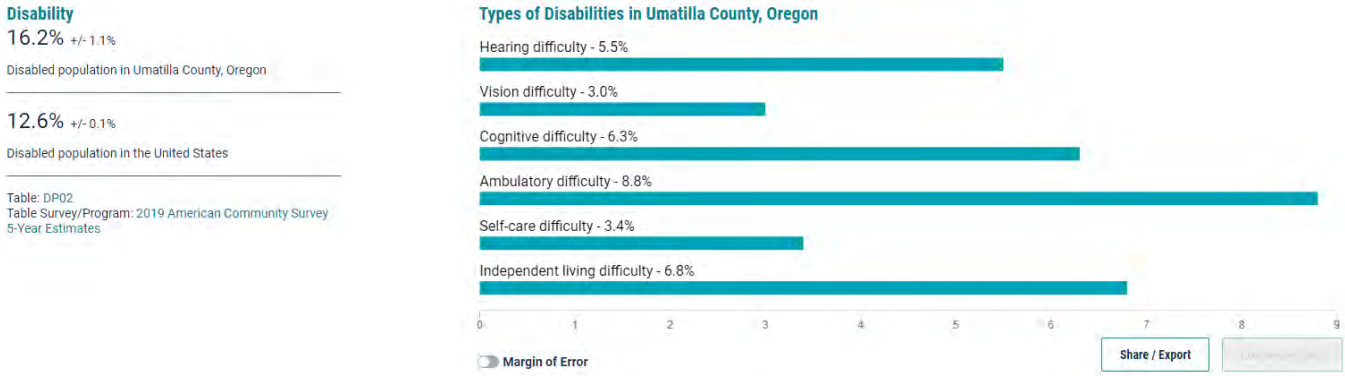
It is recognized that those who lack health insurance or are impaired with sensory, mental or physical disabilities, have higher vulnerability to hazards and will likely require additional community support and resources. On a similar note, a community with high percentages of drug dependency and violent crimes may experience increased issues with the disruption of normal social systems. It is likely that the continuity of services will be interrupted by a disaster.

Figure B-19 Health in Umatilla County, OR



Source: U.S. Census Bureau, Umatilla County, https://data.census.gov/cedsci/profile?g=0500000US41059, accessed 01/12/21

Figure B-20 Disability in Umatilla County, OR



Source: U.S. Census Bureau, Umatilla County, https://data.census.gov/cedsci/profile?g=0500000US41059, accessed 01/12/21

Table B-7 Behavioral Health Profile of Umatilla County

Population Statistics	**County**	**Oregon**
Population	78,340	3,962,710
Growth Rate	-0.3%	4.1%
Poverty Rate (all ages)	17.1%	16.7%
Poverty Rate (ages 5 to 17)	20.0%	20.1%
Unemployment Rate	6.5%	5.7%
Percent on Medicaid	36.6%	31.8%
Identified Mental Health (MH) or Substance Use (SU) Conditions, Medicaid Population		
Children under 12 with MH Condition	25.9 %	27.7 %
Youth (12 to 17) with MH Condition	31.7%	33.9%
Youth (12 to 17) Identified SU Condition	6.6 %	7.5 %
Young Adults (18 to 25) with Mild to Moderate MH Condition	23.9%	26.7%
Young Adults (18 to 25) with Serious MH Condition	5.6%	8.3%
Young Adults (18 to 25) with SU Condition	20.2 %	20.2 %
Adults (26 and older) with Mild to Moderate MH Condition	20.5%	27.6%
Adults (26 and older) with Serious MH Condition	11.7%	14.0%
Adults (26 and older) with SU Condition	6.0%	7.6%
Count of Persons Admitted to Oregon State Hospital		
Civil Commitments	12	470
Aid & Assist	8	674
Guilty Except for Insanity	14	299
Per Capita Public Funding		
OHP Funding	$129.31	$140.91
Other Medicaid Funding	$74.26	$53.97
State and Local Investments	$35.38	$55.00
Total Per Capita Public Behavioral Health Funding	$238.95	$249.88
CCO Plan(s)		
Eastern Oregon Coordinated Care Org.		

Source: Oregon Health Authority, *Umatilla County Behavioral Health Profile*, 2015, https://www.oregon.gov/oha/HSD/AMH/BH%20Mapping%20Profiles/Umatilla%20County%20BH%20Profile.pdf.

Synthesis

Umatilla County must consider both short- and long-term socio-demographic information and the implications it highlights related to hazard resilience. Immediate concerns such as the presence of a significant low-income population can result in a substantial reliance on public services and assistance. Another notable demographic is the county's large Hispanic and Latino population, which may have less access to public outreach related to natural hazard preparedness and response. These factors and factors such as populations without health insurance and median household income, can have long-term impacts on the economy and stability of the community, ultimately affecting future resilience.

Regional Economic Capacity

Regional 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 components of the economy work and are interconnected in the existing economic picture. Once inherent strengths or systematic vulnerabilities are apparent, both the public and private sectors can take action to improve them, thereby increasing the resilience of the local economy.

Regional Affordability

The evaluation of regional affordability supplements the identification of socio demographic capacity indicators, i.e. median income, and is a useful 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 homeowners and renters to implement mitigation can be drastically reduced. Therefore, regional affordability is a mechanism for generalizing the abilities of communities to recover 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 Gini Index is a summary measure of income inequality. The Gini coefficient incorporates the detailed shares data into a single statistic, which summarizes the dispersion of income across the entire income distribution. The Gini coefficient ranges from 0, indicating perfect equality (where everyone receives an equal share), to 1, perfect inequality (where only one recipient or group of recipients receives all the income). The Gini is based on the difference between the Lorenz curve (the observed cumulative income distribution) and the notion of a perfectly equal income distribution.[50]

[50] U.S. Census Bureau*, Income Inequality, The Gini Index*, https://www.census.gov/topics/income-poverty/income-inequality/about/metrics/gini-index.html

Based on social science research, a region's cohesive response to a hazard event may be affected by the distribution of wealth in communities that have less income equality.[51]

Umatilla County is listed as #23 out of 36 counties in Oregon on the Gini Index. The counties shown on Oregon's Gini Index are those with more than 24,999 population and at least 25 housing units. [52] An Oregon State University and The Oregon Community Foundation report from 2015 describes that compared to all other states, Oregon has average levels of income inequality. Nationally, Oregon ranks 22nd among the 50 states and Washington D.C., where ranking 1st means having the lowest inequality and ranking 51st means having the highest inequality. Oregon's level of inequality is slightly below the national average. [53]

According to an Oregon Employment Department article dated July 24, 2018, "The degree of wage inequality in Oregon has generally increased since 1990, though not steadily. The state's Gini coefficient for all year-round workers rose from 1991 through the mid-1990s, and then was largely flat before rising to a peak in 2000. Since 2000, the coefficient fell slightly in 2001 and 2002, during the first economic slowdown of the decade. Afterwards, it began a steady rise to a second peak in 2007, as the state's economy recovered from the recession earlier in the decade. The coefficient decreased a little again in 2008 and 2009 and subsequently rose to reach its highest point in 2015. It dropped slightly in 2016 and remained essentially unchanged in 2017".[54]

In **Figure B-21**, the median family income by race is shown for families in Umatilla County. It reveals a substantial difference in income by race. In **Figure B-22**, the source of income for families is identified as coming from the following five sources: wages, self-employment, investments and retirement, social security, and public assistance and SSI.

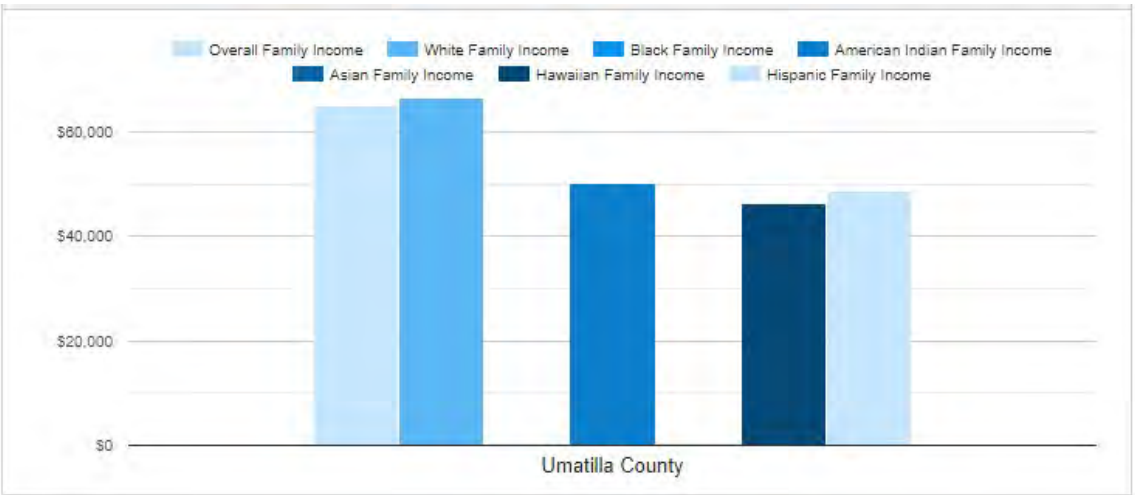
[51] Susan Cutter, Christopher G. Burton, and Christopher T. Emrich. 2010, *Disaster Resilience Indicators for Benchmarking Baseline Conditions*, Journal of Homeland Security and Emergency Management 7, no.1: 1-22, http://resiliencesystem.com/sites/default/files/Cutter_jhsem.2010.7.1.1732.pdf

[52] Town Charts, *Top 25 Oregon Counties Ranked by the Gini Index,* http://www.towncharts.com/Oregon/Top-25-Counties-in-Oregon-ranked-by-The-Gini-Index.html.

[53] Oregon State University and The Oregon Community Foundation, *TOP: Tracking Oregon's Progress: A Focus on Income Inequality*, https://www.oregoncf.org/Templates/media/files/reports/top_indicators_2015.pdf and *TOP: Tracking Oregon's Progress: Toward a Thriving Future: Closing the Opportunity Gap for Oregon's Kids,* https://oregoncf.org/Templates/media/files/research/top_report_2017.pdf

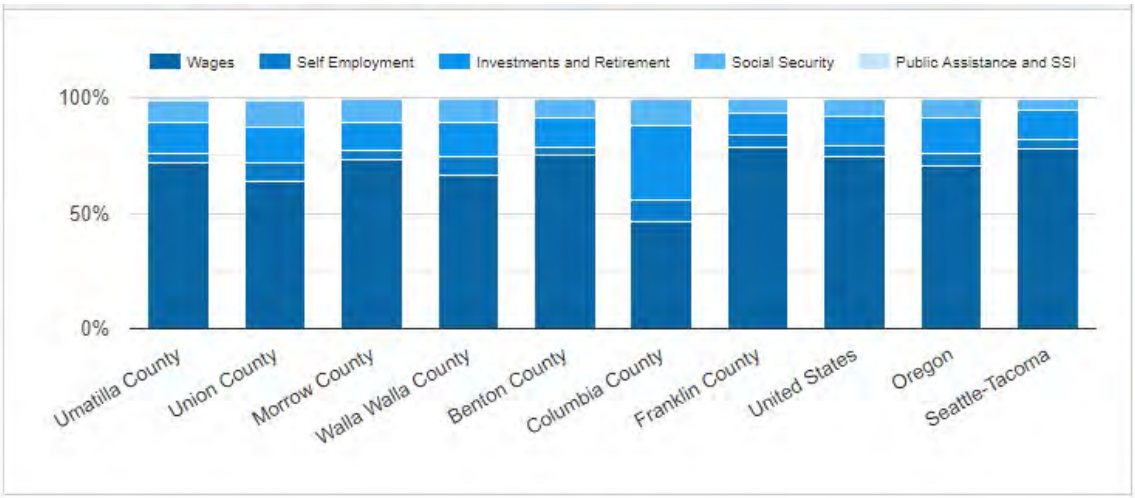
[54] Oregon Employment Department, *Wage Inequality in Oregon: The Widening Gap*, https://www.qualityinfo.org/-/wage-inequality-in-oregon-the-widening-gap

Figure B-21 Median Family Income by Race in Umatilla County, OR



Source: Town Charts, Umatilla County, OR, https://www.towncharts.com/Oregon/Economy/Umatilla-County-OR-Economy-data.html, accessed 2/1/21

Figure B-22 Source Income in Umatilla County, OR



Source: Town Charts, Umatilla County, OR, https://www.towncharts.com/Oregon/Economy/Umatilla-County-OR-Economy-data.html, accessed 2/1/21

Housing Affordability

Housing affordability is a measure of economic security gauged by the percentage of a metropolitan area's households paying less than 35% of their income on housing.[55] Households spending more than 35% are considered housing cost burdened. **Table B-8** displays the percentage of home owners and renters reflecting housing cost burden in Umatilla County as well as the averages for Oregon and the United States as a whole. In general, the population

[55] University of California Berkeley, Building Resilient Regions, *Resilience Capacity Index*, http://brr.berkeley.edu/rci/

that spends more of their income on housing has proportionally fewer resources and less flexibility for alternative investments in times of crisis.[56]

High incidence of housing cost burden can impose serious 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, and in the event that their employer is also impacted, it will further the detriment experienced by these individuals and families. In comparison to state and national levels, Umatilla County has significantly lower percentages of homeowners and renters paying more than 35% of their income on housing. This suggests that Umatilla County renters and homeowners may be in a better position than much of Oregon and the rest of the nation to weather an extensive natural hazard event.

Table B-8 Households Spending > 35% of Income on Housing

Jurisdiction	Owners		Renters
	With Mortgage	Without Mortgage	
Umatilla County	9.0%	11.1%	36.4%
Oregon	11.0%	40.0%	33.9%
United States	9.8%	39.4%	38.3%

Source: U.S. Census Bureau, American Fact Finder, Table DP04, Selected Housing Characteristics, 2013-2017, https://data.census.gov/cedsci/table?q=Selected%20Housing%20Characteristics&g=0100000US_0400000US41_0500000US41059&tid=ACSDP1Y2019.DP04&hidePreview=true

Economic Diversity

Economic diversity is a general indicator of an area's fitness for weathering difficult financial times, but it is not a guarantor of economic vitality or resilience. [57]

One method for measuring economic diversity is through use of the Hachman Index, a formula that compares the composition of county and regional economies with those of states or the nation as a whole. Using the Hachman Index with the state of Oregon, a diversity ranking of 1 indicates the Oregon 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. As shown in **Table B-9**, Umatilla County sits between Union County, a highly ranked county in terms of economic diversity, as well as several of the lowest ranked counties, with neighboring Morrow and Grant Counties ranked 32 and 33 respectively in the state overall. The Umatilla County economic diversity ranking is 19[58], exactly in the middle of Oregon's 36 counties.

[56] Ibid.

[57] Business Oregon, *Distressed Areas in Oregon*, https://www.oregon4biz.com/Publications/Distressed-List/

[58] Oregon Employment Department – 2019 Hachman Index Scores by County

Table B-9 County Hachman Index Scores and Ranking

County	Hachman Index Score		State Ranking	
	2019	2009	2019	2009
Umatilla	0.369	0.357	19	18
Morrow	0.091	0.103	32	32
Grant	0.075	0.093	33	33
Union	0.484	0.502	13	10
Wallowa	0.201	0.169	28	28

Source: Oregon Employment Department – 2019 Hachman Index Scores by County, https://www.qualityinfo.org/-/measuring-local-industry-employment-diversity-with-the-hachman-index, accessed 02/01/21.

Anticipated job growth in rural areas of Oregon, according to employment projections covering the 2014 to 2024 period, is muted compared with anticipated growth in metro areas. Between 2014 and 2024, statewide growth is anticipated to be about 14 percent. In the eight-county Eastern Oregon region, growth is pegged at 6 percent – less than half the statewide rate.[59]

No matter what the size of the local economy, a certain level of demand for workers exists. Approaching opportunity through the lens of high-wage and high-demand jobs or the level of replacement openings in an area illustrates how varied job opportunities are in rural Oregon.[60]

More than 40 percent of rural Oregon employment is concentrated in natural resources, leisure, and hospitality (tourism), and government. Together those three sectors make up around 27 percent of the employment in urban Oregon. Manufacturing employment in Oregon has decreased 8 percent between 1990 and 2016, and it has shifted with more happening in the Portland metro area and less in the rural counties. In addition, rural Oregon's historic reliance on resource extraction has shifted as timber harvest levels have declined.[61]

The Oregon Employment Department designates counties, cities, communities or other geographic areas experiencing high unemployment, poverty and job loss as economically distressed. The Distressed Counties List is used to highlight Oregon communities that may need additional support. The distressed designation may provide a community with an advantage if it applies for funds from state and federal sources. Business Oregon gives priority when funding technical assistance, programs and projects to geographic areas determined to be economically distressed as prescribed by Oregon law. Umatilla County is listed as a distressed area.[62]

Employment and Wages

Unemployment Rate in Umatilla County, OR was 4.60% in November of 2020, according to the United States Federal Reserve. Historically, Unemployment Rate in Umatilla County, OR reached a

[59] Oregon Employment Department, *The Employment Landscape of Rural Oregon*, May 2017, https://www.qualityinfo.org/documents/10182/13336/The+Employment+Landscape+of+Rural+Oregon?version=1.0

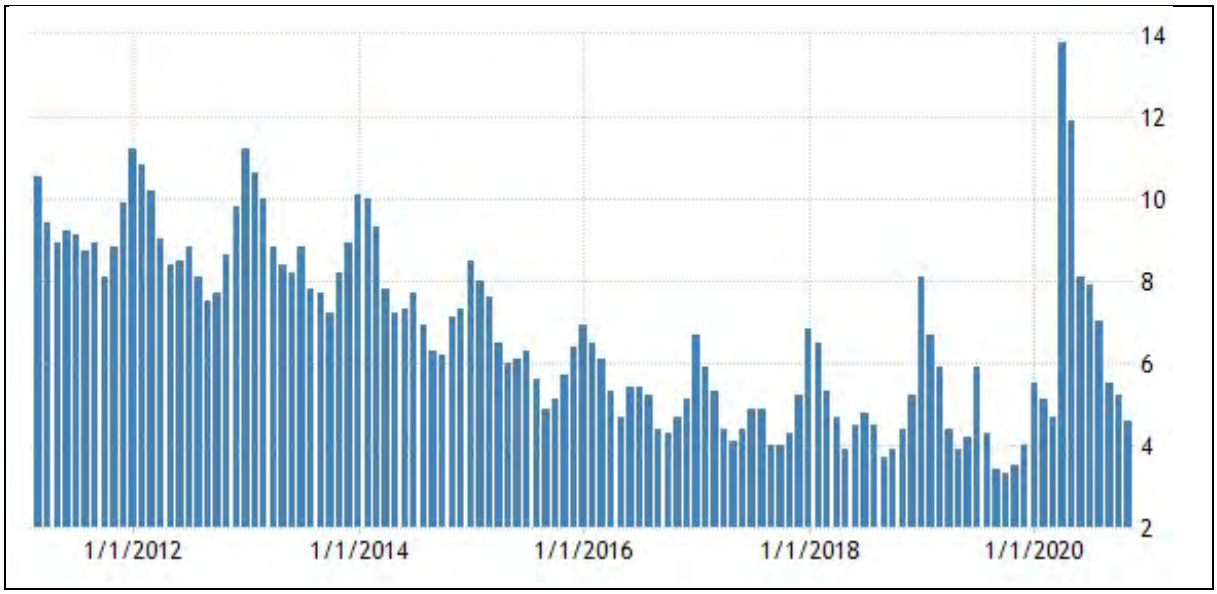
[60] Ibid.

[61] Oregon Employment Department, *The Employment Landscape of Rural Oregon*, May 2017, https://www.qualityinfo.org/documents/10182/13336/The+Employment+Landscape+of+Rural+Oregon?version=1.0

[62] Business Oregon, *Distressed Areas in Oregon*, https://www.oregon4biz.com/Publications/Distressed-List/

record high of 14.30 in January of 1993 and a record low of 3.30 in October of 2019.[63] As shown in **Figure B-23**, Umatilla County experience near record high unemployment in 2020 due to the COVID-19 pandemic. However, the unemployment rate dropped back down to near 5% at the start of 2021.

Figure B-23 Umatilla County Unemployment Rate Past 10 Years



Source: Trading Economics, *Unemployment Rate in Umatilla County, OR According to the Federal Reserve, February 2021*, https://tradingeconomics.com/united-states/unemployment-rate-in-umatilla-county-or-percent-m-nsa-fed-data.html accessed 01/12/21.

Table B-10 shows Umatilla County's population (2018) in relation to employment and per capita income Umatilla County in 2018. Umatilla County's average per capita income ($40,398) is substantially lower than that of the United States ($55,426). [64]

Table B-10 Umatilla County Population, Employment, and Per Capita Income

	Umatilla County, OR	United States
Population		
Population, 2000	70,728	282,162,411
Population, 2018	77,516	327,167,434
Employment		
Employment, 2000	37,979	165,370,800
Employment, 2018	40,392	200,746,000
Per Capita Income		
Per Capita Income, 2000 (2019 $s)	$32,675	$45,526
Per Capita Income, 2018 (2019 $s)	$40,398	$55,426

Source: BLM, *Socioeconomic Profile for Umatilla County*, saved as PDF on 01/18/21.

[63] Trading Economics, *Unemployment Rate in Umatilla County, OR According to the Federal Reserve*, February 2021, https://tradingeconomics.com/united-states/unemployment-rate-in-umatilla-county-or-percent-m-nsa-fed-data.html

[64] BLM, *Socioeconomic Profile for Umatilla County*, saved as PDF on 01/18/21

Industry

Major Regional 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.[65]

This is of specific concern when the businesses belong to basic sector industries. Basic sector industries are those that are dependent on sales outside of the local community. 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 and social assistance.[66]

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.[67] Thus, understanding and addressing the sensitivities of these industries is a strategic way to increase the resiliency of the entire regional economy.

Umatilla County generally specializes in farming, agricultural services, forestry, fishing, mining, construction, transportation and public utilities, retail trade, and both the federal and state/local government sectors. However, like many of the counties in northeastern Oregon and those along the Mid-Columbia River, government, retail, and health and social assistance industries form a crucial cross-section of the county's employment opportunities.

Table B-11 identifies jobs by industry in 2018. The top industry sectors in Umatilla County are Services Related (55.2%), Non-Services Related (26.6%), and Government (18.1%).[68]

[65] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, Region 5 Risk Assessment, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_11_RA5.pdf

[66] Ibid

[67] Ibid.

[68] BLM, *Socioeconomic Profile for Umatilla County*, saved as PDF on 01/18/21

Table B-11 Jobs by Industry for Umatilla County (2018)

	Umatilla County, OR	United States
Total number of jobs	40,392	200,746,000
Non-services related	10,764	29,401,700
Farm	3,733	2,604,000
Forestry, fishing, & ag. services	1,522	969,400
Mining (including fossil fuels)	115	1,353,700
Construction	1,741	10,973,300
Manufacturing	3,653	13,501,300
Services related	22,305	146,801,300
Utilities	178	589,700
Wholesale trade	982	6,422,200
Retail trade	3,996	19,307,500
Transportation and warehousing	2,981	9,364,300
Information	236	3,460,100
Finance and insurance	921	10,394,600
Real estate and rental and leasing	1,228	9,504,800
Professional and technical services	950	14,203,900
Management of companies	146	2,669,500
Administrative and waste services	1,294	12,472,900
Educational services	160	4,771,700
Health care and social assistance	4,288	22,619,800
Arts, entertainment, and recreation	443	4,684,900
Accommodation and food services	2,702	15,077,500
Other services, except public admin.	1,800	11,257,900
Government	7,323	24,543,000
Residual	0	0

All employment data are reported by *place of work*. Estimates for data that were not disclosed are indicated with tildes (~).

Source: BLM, *Socioeconomic Profile for Umatilla County*, saved as PDF on 01/18/21.

Umatilla County's primary employment industries are non-basic in nature (government, retail, health and social assistance), although two of the five largest industries in terms of overall employment (manufacturing and natural resources and mining) are of the basic nature and dependent to a large degree on sales outside of the local community. Basic industries encourage growth in non-basic industries and bring wealth into communities from outside markets. However, a high dependence on basic industries can lead to severe difficulties when recovering from a natural disaster if vital infrastructure or primary resource concentrations have been greatly damaged.

Table B-12 identifies wages by industry in 2018. The average annual wages by industry in Umatilla County are as follows: Government ($51,540), Services Related ($38,919), and Non-services Related ($38,275).[69]

[69] Ibid.

Table B-12 Wages by Industry for Umatilla County (2018)

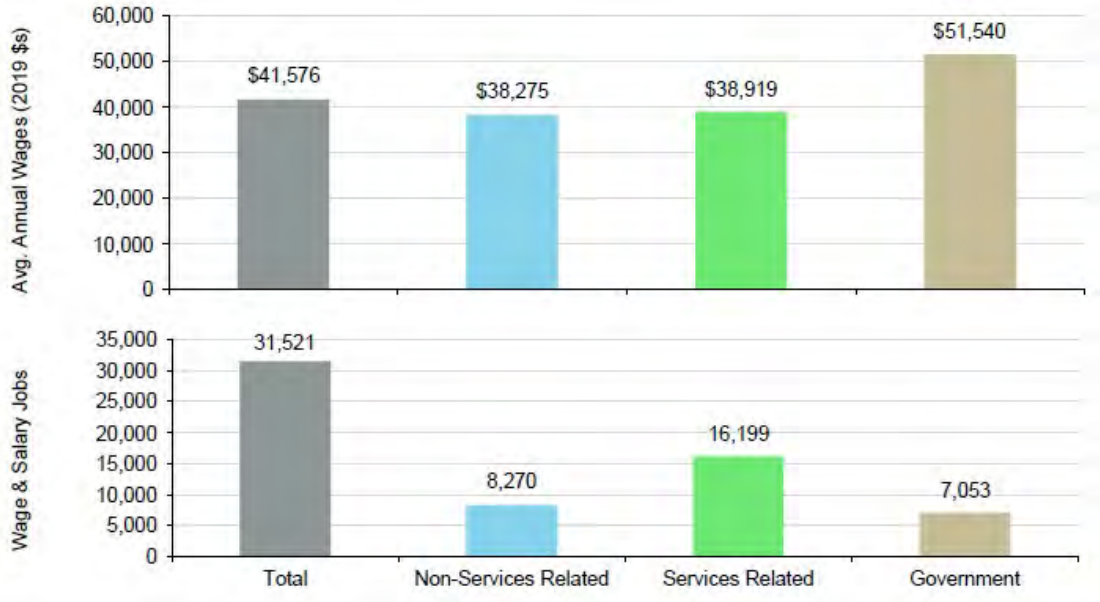
Employment and Wages in 2019, Aggregated Region	Wage & Salary Employment	% of Total Wage & Salary Employment	Avg. Annual Wages (2019 $s)	United States Avg. Annual Wages (2019 $s)
Total	31,521		$41,576	$59,219
Private	24,469	77.6%	$38,702	$59,213
Non-Services Related	8,270	26.2%	$38,275	$67,510
Natural Resources and Mining	3,746	11.9%	$32,578	$61,836
Agriculture, forestry, fishing & hunting	3,714	11.8%	$32,392	$37,198
Mining (incl. fossil fuels)	31	0.1%	$55,853	$107,973
Construction	1,201	3.8%	$49,488	$64,839
Manufacturing (Incl. forest products)	3,324	10.5%	$40,633	$69,928
Services Related	16,199	51.4%	$38,919	$57,448
Trade, Transportation, and Utilities	6,413	20.3%	$41,991	$49,305
Information	409	1.3%	$83,783	$119,654
Financial Activities	712	2.3%	$48,211	$98,509
Professional and Business Services	1,197	3.8%	$42,177	$78,402
Education and Health Services	3,782	12.0%	$44,035	$51,909
Leisure and Hospitality	2,629	8.3%	$17,824	$25,079
Other Services	1,048	3.3%	$26,874	$39,942
Unclassified	10	0.0%	$52,738	$62,249
Government	7,053	22.4%	$51,540	$59,253
Federal Government	487	1.5%	$75,231	$84,313
State Government	1,453	4.6%	$69,451	$62,810
Local Government	5,113	16.2%	$44,194	$53,119

Source: BLM, *Socioeconomic Profile for Umatilla County*, saved as PDF on 01/18/21.

Some of the highest wage jobs in Umatilla County are in the information services industry as well as government. However, these high wage industries employ fewer people than other sectors. Even if the average wages for a given sector are relatively low, that sector may still be an important driver of the local economy if it supports a significant share of the total jobs in the area. Wages provide a good counter-part to the per capita income figure. In some areas, per capita income can be high (sometimes driven by a high proportion of non-labor income) while wages are low. A good indicator of an overall strong local economy is when both per capita income and wages are high.[70]

[70] Ibid.

Figure B-24 Wages & Employment by Industry for Umatilla County



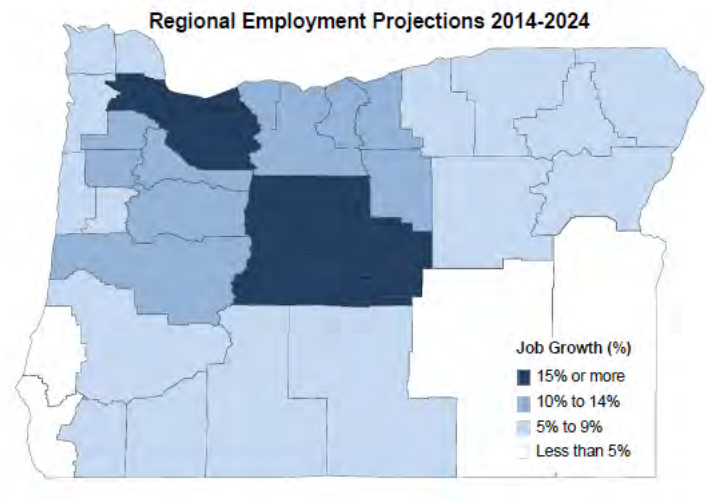
Source: BLM, *Socioeconomic Profile for Umatilla County*, saved as PDF on 01/18/21.

Future Employment in Industry

According to the *The Employment Landscape of Rural Oregon*, anticipated job growth in rural areas of Oregon, according to employment projections covering the 2014 to 2024 period, is muted compared with anticipated growth in metro areas. Between 2014 and 2024 statewide growth is anticipated to be about 14 percent. As shown in Figure C-28, in the eight-county Eastern Oregon region, growth is pegged at 6 percent – less than half the statewide rate. Employment in the Columbia Basin (Grant, Morrow, and Umatilla counties) is expected to grow 7 percent between 2014 and 2024. More than 2,900 job openings are anticipated due to growth and another 9,600 openings are anticipated to replace workers leaving their occupations, mostly through retirements. Government is the top source of replacement needs, with more than 1,500 replacement openings over the decade. Education and health services will have 1,400 replacement openings, while manufacturing, retail trade, and natural resources industries will have more than 1,000 apiece. [71]

[71] Oregon Employment Department, *The Employment Landscape of Rural Oregon*, May 2017, https://www.qualityinfo.org/documents/10182/13336/The+Employment+Landscape+of+Rural+Oregon?version=1.0

Figure B-25 Regional Employment Projections



Source: Oregon Employment Department, *The Employment Landscape of Rural Oregon*, May 2017, https://www.qualityinfo.org/documents/10182/13336/The+Employment+Landscape+of+Rural+Oregon?version=1.0

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. Umatilla County has a relatively stable unemployment rate, a diverse economy, a low level of housing cost burden and is expected to create more future jobs than other eastern Oregon counties. As such, the county is poised to experience a less difficult time in recovering from a natural disaster than many surrounding Counties, which already suffer from high unemployment levels and low economic diversity profiles. However it is important to consider what might happen to the county economy if some of the largest revenue generators and employers (retail, manufacturing, and health care and social assistance industries), were heavily impacted by a disaster. To an extent, and to the benefit of Umatilla County, these particular industries are a mix of basic and non-basic in nature, dependent on both external markets and local residents.

It is imperative however that Umatilla County continues to recognize that economic diversification is a long-term issue; more immediate strategies to reduce vulnerability should focus on risk management for the dominant industries.

Built Capacity

Built 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.

Figure B-28 Umatilla County Building Density shows the percentage of land covered by buildings within the county. As would be expected, the areas with the highest building density is typically confined to the cities and generally corresponds to the population density for the county.

Housing Building Stock

Housing characteristics are an important factor in hazard mitigation planning, as some housing types tend to be less disaster resistant than others, and therefore warrant special attention. **Table B-13** identifies the type of housing most common throughout Umatilla County. Of particular interest are mobile homes and other non-permanent housing structures (including boats, RVs, vans, etc.), which account for nearly 19 percent of the housing in Umatilla County. Mobile structures are particularly vulnerable to certain natural hazards, such as windstorms, and special attention should be given to securing the structures as they are typically more prone to damage than wood-frame construction.[72]

It is also important to consider multi-unit structures, as they are more vulnerable to the impacts from natural disasters due to the increased number of people living in close proximity. In short, a structural weakness in a multiunit structure will have an amplified impact on the population. According to the data presented in **Table B-13**, roughly 21 percent of housing in Umatilla County is made up of multi-family dwellings. A majority of Umatilla County's housing stock is single-family homes. This suggests that hazard mitigation and outreach should specifically address preparedness for detached housing structures.

Table B-13 Umatilla County Housing Type Summary

Housing Type	Number	Percent
1 Unit	18,505	59.8%
2 to 9 Units	3,709	11.9%
10 to 19 Units	935	3.0%
20 or More Units	2,002	6.5%
Mobile Home	5,626	18.2%
Boat, RV, Van, etc.	132	0.4%
Total	**30,909**	-

Source: U.S. Census Bureau, American Fact Finder, Table DP04, Selected Housing Characteristics, 2013-2017, https://data.census.gov/cedsci/table?q=Selected%20Housing%20Characteristics&g=0100000US_0400000US41_0500000US41059&tid=ACSDP1Y2019.DP04&hidePreview=true Accessed 02/01/21.

Age of housing is another characteristic that influences a structure's vulnerability to hazards. Generally, the older a home is, the greater the risk of damage from natural disasters. This is because stricter building codes have only been implemented in recent decades, following improved scientific

[72] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, Region 5 Risk Assessment, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_11_RA5.pdf

understanding of plate tectonics and earthquake risk. In Oregon, many structures built after the late 1960's began utilizing earthquake resistant designs and construction. Similarly, communities in the northwest began implementing flood elevation ordinances in the 1970's.[73] In 1990 Oregon again upgraded to stricter seismic standards that included earthquake loading in the building design.[74] **Table B-14** shows that just under 31% of the housing stock in Umatilla County was built after 1990 when the more stringent building codes were put in place, leaving about 69% with questionable seismic stability, and over 30% with very questionable seismic stability (percentage of homes built before 1960). [75] Thus knowing the age of the structure is helpful in targeting outreach regarding retrofitting and insurance for owners of older structures.[76]

Table B-14 Umatilla County Housing Year Built

Housing Type	Number	Percent
Built 2010 or Later	1,625	5.3%
Built 2000 to 2009	3,041	9.8%
Built 1990 to 1999	4,883	15.8%
Built 1980 to 1989	3,412	11.0%
Built 1970 to 1979	6,157	19.9%
Built 1960 to 1969	2,583	8.4%
Built 1950 to 1959	3,258	10.5%
Built 1940 to 1949	1,970	6.4%
Built 1939 or Earlier	3,980	12.9%

Source: U.S. Census Bureau, American Fact Finder, Table DP04, Selected Housing Characteristics, 2013-2017, https://data.census.gov/cedsci/table?q=Selected%20Housing%20Characteristics&g=0100000US_0400000US41_0500000US41059&tid=ACSDP1Y2019.DP04&hidePreview=true Accessed 02/01/21.

[73] Ibid.

[74] Wang Yumei and Bill Burns, *Case History on the Oregon GO Bond Task Force: Promoting Earthquake Safety in Public Schools and Emergency Facilities*, National Earthquake Conference. January 2006.

[75] U.S. Census Bureau, American Fact Finder, Table DP04, Selected Housing Characteristics, 2013-2017, https://data.census.gov/cedsci/table?q=Selected%20Housing%20Characteristics&g=0100000US_0400000US41_0500000US41059&tid=ACSDP1Y2019.DP04&hidePreview=true. Accessed 02/01/21.

[76] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, Region 5 Risk Assessment, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_11_RA5.pdf

Commercial Building Stock

Critical Infrastructure, Critical Facilities, and Lifelines

Critical infrastructure, critical facilities, and lifelines are those systems, structures, and facilities that are essential to government response and recovery activities (e.g., hospitals, police, fire and rescue stations, utilities, communications lines, sewer and water lines, dams, levees, school districts, and higher education institutions). The interruption of service or destruction of any of these would have a debilitating effect on the community.

Critical infrastructure, critical facilities, and lifelines in Umatilla County are identified in Volume I Section 2 Risk Assessment in the Critical Infrastructure, Critical Facilities, and Lifelines section. Rather than repeat the information, go to the other section for details. This information provides the basis for informed decisions that can be used to reduce the vulnerability of Umatilla County to natural hazards.

Dependent Facilities

In addition to the critical facilities mentioned above in Volume I Section 2 Risk Assessment, there are other vital services delivered in the county that must be accounted for when planning for natural disaster response and recovery. Assisted living centers, nursing homes, residential mental health facilities, and psychiatric hospitals are important to identify within the community because of the dependent nature of the residents. Such facilities can also serve as secondary medical facilities during an emergency, as they are equipped with nurses, medical supplies and beds.

In Umatilla County there are five adult residential care facilities and three registered nursing homes. The facilities are primarily located in Pendleton, Hermiston, and Milton Freewater. There are also twenty live-in care facilities around the county that have a resident capacity of five or less, where seniors and people with disabilities live and have care provided for them.[77] There is also a Psychiatric Hospital located in Milton-Freewater that has a 60 bed capacity and offers a range mental health related services and programs.

Correctional Facilities

Correctional facilities are incorporated into physical infrastructure as they play an important role in everyday society by maintaining a safe separation of the public from potentially dangerous human elements. There are several correctional facilities located in Umatilla County, including the Umatilla County Jail, Umatilla County Corrections and Oregon Youth Authority in Pendleton, and the Two River Correctional Institute in Umatilla. While correctional facilities are built to code to resist structural failure and typically have back up power to sustain regulation of inmates following the immediate event of an emergency, logistical planning becomes more of a challenge when the impacts of the event continue over a long duration.

Physical Infrastructure

Physical infrastructure such as dams, levees, roads, bridges, railways and airports support Umatilla 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.

[77] Ibid.

Dams and Levees

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.[78] However, the potential for severe damage still exists and should be considered in mitigation planning efforts. The Oregon Water and Resources Department (OWRD) has inventoried all non-federal dams located in Oregon that are regulated by the State of Oregon. As shown in **Table B-15**, there are no non-federal, high hazard dams in Umatilla County. Two dams, Simplot Waste Lagoon #1 and Meacham Lake Dam are rated significant hazard. Simplot Waste Lagoon #1 was last inspected in 2018 and slated for inspection in 2021. Meacham Lake Dam was last inspected in 2020 and slated for inspection in 2023. There are four dams in Umatilla County under federal agency management. These include McNary Dam, Cold Springs Dam, McKay Dam, and Indian Lake Dam. See the Flood Annex for additional information.

Table B-15 Umatilla County Non-federal Dam Inventory

Number of Dams	Hazard Level or Potential
0	High
2	Significant
8	Low

Source: Oregon Water Resources Department, http://apps.wrd.state.or.us/apps/misc/dam_inventory/ Accessed 02/01/21.

There are multiple levees that serve as an important piece of physical infrastructure, providing flood control in areas of Umatilla County. Three of the largest levee systems are managed by the Milton-Freewater Water Control District on the Walla Walla River, Umatilla River Water Control District, and the Riverside-Mission Water Control District located along the Umatilla River. Although the levee control districts are not listed as participants in the planning process for the NHMP, they could serve as important partners for the proposed mitigation actions, especially those related to flooding. In addition to the levees managed by special districts, there are also numerous private levee systems located along rivers in Umatilla County.

Railways

Railroads are major providers of regional and national cargo trade flows. The Burlington Northern Santa Fe (BNSF) Railway, the Union Pacific Railroad, as well as the Palouse River and Coulee City Lines run through Umatilla County.[79] The BNSF Line in Umatilla County is limited to the stretch of tracks that follow I-84 and the Columbia River on the northern border of the county into the state of Washington. Three main Union Pacific lines converge in the northwestern corner of the county before moving towards the center of the state. One Union Pacific line splits south to Pilot Rock while the other runs through the City of Pendleton and eventually winds into Union County. The Palouse River and Coulee City Line crosses into Umatilla County from the state of Washington near the northeastern edge of the county, and runs south through the city of Milton-Freewater before ending in Weston.

Rails are sensitive to icing from winter storms that can occur in the Columbia Gorge region. For industries in the region that utilize rail transport, these disruptions in service can result in economic losses. The potential for rail accidents caused by natural hazards can also have serious implications

[78] Federal Emergency Management Agency, *Dam Failure Information*, https://www.fema.gov/dam-failure-information, accessed March 12, 2019.

[79] Oregon Department of Transportation, State of Oregon, Oregon Railways. http://www.oregon.gov/ODOT/TD/TDATA/gis/docs/statemaps/railroads.pdf?ga=t

for the local communities if hazardous materials are involved.[80] Sparks from rails have also been known to start wildfires.

Airports

Umatilla County has 11 private airports, including heliports at two of the county's hospitals and another at McNary Dam. There are two public airports in the City of Pendleton, the Hermiston Municipal Airport and the Eastern Oregon Regional Airport.[81] There are two other regional airports in the vicinity, the Walla Wall Regional Airport and the Tri-Cities Airport, which are both located in Washington. The Portland International Airport in Portland and the Seattle-Tacoma International Airport in Seattle are the closest international commercial service airports near Umatilla and surrounding Counties. Access to these airports faces the potential for closure from a number of natural hazards, including wind and winter storms common to the region.[82]

Power Generation

A substantial portion of the region's electricity is generated through hydropower, and the regions primary energy generating dams are situated on the Columbia River. There is one major hydroelectric dam in Umatilla County, The McNary Dam, which is located on the Columbia River just north of Hermiston. There are also two natural gas combustion facilities in the county: a 547 megawatt (MW) natural gas power plant located outside of Hermiston, which is operated by the Calpine Corporation; and the 468 MW Hermiston Generating Project, also located outside of Hermiston, which is owned by the Hermiston Generating Company and PacifiCorp, and operated by the U.S. Operating Services Corporation.

Historically, Umatilla County controlled a majority of Oregon's total wind energy, as in 2006 when the county held more than 70 percent of the state's total wind energy portfolio, with 186 Megawatts of capacity.[83] Today, operational wind projects in Umatilla County account for over 390 Megawatts, and over 703 Megawatts are either permitted or proposed.[84]

Figure B-25 Umatilla County Utility Service Areas shows the boundaries of the four utility providers in Umatilla County: Pacific Power, Umatilla Electric Cooperative, Milton-Freewater City Light and Power, and Hermiston Energy Services.

Pacific Power

Pacific Power serves customers in Southern Washington, Oregon, Northern California, Eastern Idaho, Utah and Wyoming. Pacific Power transmission lines that transmit power to customers across Oregon cross through Umatilla County from the McNary Dam.

[80] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, Region 5 Risk Assessment, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_11_RA5.pdf

[81] FAA Airport Master Record. 2011. http://www.faa.gov/airports/airport_safety/airportdata_5010/

[82] DLCD, *2020 Oregon Natural Hazards Mitigation Plan*, Region 5 Risk Assessment, https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_11_RA5.pdf

[83] OSU Rural Studies Department, Special Report 1067 - http://ruralstudies.oregonstate.edu/sites/default/files/pub/pdf/umatilla_sr1067.pdf

[84] Wind Power Generation Facilities Tracking Sheet, County Planning Department, 03/05/2021.

Umatilla Electric Cooperative

The Umatilla Electric Cooperative engages in energy transmission and distribution, providing electric service to customers in most of Umatilla County, as well as some coverage in Morrow and Union Counties.

Milton-Freewater City Light & Power

Milton-Freewater City Light & Power serves approximately 4550 customers with average annual sales of 118,000,000 KWH, and is the oldest municipal electric utilities in the state. It has been in operation since 1889. The power supplied by the utility is provided by the Bonneville Power Administration.[85]

Hermiston Energy Services

Hermiston Energy Services is a municipally owned electric utility. The City of Hermiston acquired the electric facilities of Pacific Power and Light within the Hermiston city limits, and has contracted most of the operation to the Umatilla Electric Cooperative.

Roads and Bridges

The region's major expressway is Interstate 84. It runs from the Northwest corner of Umatilla County east towards Union County, and is the main passage for automobiles, buses and trucks traveling along northern Oregon to Idaho. Other major highways that service this region include:

- Interstate 82 runs south from Tri-cities in Washington, passing south near the Cities of Umatilla and Hermiston before connecting with I-84.
- US Highway 11 runs south from Walla Walla, Washington to the City of Milton Freewater before passing through the City of Pendleton.
- US Highway 395 runs south from the City of Pendleton through Pilot Rock and Long Creek before merging with Highway 26 at Mt Vernon in Grant County.
- US Highway 730 splits north from Interstate 84 just before the Umatilla Army Depot and runs northeast along the Columbia River until it passes into Washington.
- Highway 207 splits south from Highway 730 near Hat Rock State Park. It passes southwest through Hermiston before merging with Highway 74 at Lexington in Morrow County.
- Highway 74 splits from Highway 395 just west of Pilot Rock before intersecting with US Highway 207 again at Heppner in Morrow County.

Daily transportation infrastructure capacity in Umatilla County is moderately stressed by maintenance, congestion, and oversized loads, however peak loads and congestion can materialize during major construction projects, but can also fluctuate by season. Natural hazards tend to further disrupt automobile traffic and create gridlock; this is of specific concern in periods of evacuation during an emergency.

[85] The official website for Milton-Freewater, Oregon, http://mfcity.com/electric

The existing condition of bridges in the region is also a factor that affects risk from natural hazards. Bridge failure can have immediate and long term implications in the response and recovery of a community. Incapacitated bridges can disrupt traffic and exacerbate economic losses due to the inability to transport products and services in and out of the area. There are a number of bridges in Umatilla County listed on the National Bridge Inventory (NBI), which only includes bridges 20' or longer. Bridges less than 20' are considered non-NBI. **Table B-16** represents the condition of NBI bridges throughout the county and the participating cities. [86]

Table B-16 NBI Bridge Ratings for Umatilla County

Jurisdiction	N/A	Good	Fair	Poor	Total
Adams	-	1	1	-	2
Athena	1	-	-	-	1
Echo	1	-	-	-	1
Helix	1	-	-	-	1
Hermiston	-	1	-	-	1
Milton-Freewater	1	-	-	-	1
Pendleton	-	3	5	-	8
Pilot Rock	-	1	3	-	4
Stanfield	-	2	-	-	2
Ukiah	1	-	-	-	1
Umatilla	1	-	-	-	1
Weston	-	-	3	2	5
Unincorporated	-	45	108	12	165

Source: Oregon's Local Government Bridge Conditions, https://www.oregon.gov/ODOT/TAP/Pages/BridgeData.aspx, accessed 02/03/21.

Oregon Department of Transportation (ODOT) provides an interactive mapping program, TransGIS, which provides updated information on structures (such as bridges), highways, traffic data and more. Bridge information is available for ODOT managed bridges, such as locations and their status (structurally deficient, closures, etc.). **Figure B-26** ODOT Bridge Conditions shows ODOT bridges within Umatilla County, identifying those classified as structurally deficient as of September 2020.

Structurally Deficient is defined as: "*A bridge condition rating used by the Federal Highway Administration to indicate deteriorated physical conditions of the bridge's structural elements (primarily deck, superstructure, and substructure) and reduced load capacity. Some of these bridges are posted and may require trucks of a certain weight to detour. A classification of "structurally deficient" does not imply that bridges are unsafe. When an inspection reveals a safety problem, the bridge is posted for reduced loads, scheduled for repairs, or in unusual situations, closed until repairs can be completed. Structural deficiency is one of the many factors that are used in the ODOT State Bridge Program for project ranking or selection.*" [87]

[86] ODOT, *Oregon's Local Government Bridge Conditions*, https://www.oregon.gov/ODOT/TAP/Pages/BridgeData.aspx.

[87] ODOT, *2020 Bridge Condition Report and Tunnel Data*, *https://www.oregon.gov/odot/Bridge/Documents/Final_2020BridgeConditionReport.pdf*

Utility Lifelines

Utilities 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. Utilities are closely related to physical infrastructure, (i.e., dams and power plants) as they transmit the power generated from these facilities.

The network of electricity transmission lines running through the region is operated by Pacific Power and Light, the Umatilla Electric Cooperative, the Bonneville Power Administration, and several other entities that facilitate local energy production and distribution in the area. It is further disseminated through local utility distribution lines.

Gas Service

There are two natural gas transmission lines that intersect in Umatilla County near the city of Stanfield.[88] The lines service local communities and feed the county's two natural gas fired cogeneration facilities. Cascade Natural Gas Corporation controls the Williams/Northwest pipeline that crosses the Columbia River into Umatilla County from its northwestern border before it moves to Union County in the southeast. The Gas Transmission Northwest Pipeline, controlled by TransCanada, passes into Umatilla County from the north near Walla Walla before moving east into Morrow County. Most of the natural gas Oregon uses originates in Alberta, Canada, and Avista Utilities owns the main natural gas transmission pipeline.[89] These lines are potentially vulnerable to severe, but infrequent natural hazards, such as earthquakes, which could disrupt service to natural gas consumers across the region. Both Ferrellgas and Ameri Gas distribute pressurized natural gas to communities in Oregon and Washington. Umatilla County has access to the services of both companies through service centers in nearby Walla Walla, WA.

Telecommunications

There are many telecommunication providers in Umatilla County, including CenturyLink and Charter Communications, the third and fourth largest telecommunications companies in the United States. Eastern Oregon Telecom, Comcast, US Cellular and other telecommunication companies also serve the county.

Sewer, Land Fill and Industrial Waste

There are ten community wastewater systems permitted in the county, however the cities of Pendleton and Hermiston both have additional permits that allow them to dispose of industrial waste. There are 54 similar permits granted to independent facilities across the county, and residential septic tanks are prevalent across the region.[90]

There are five sanitary landfills or transfer stations available in the area to Umatilla County residents: Pendleton Sanitary Services and Tribal Environmental Recovery in Pendleton; Walla Walla Regional Landfill in Walla Walla, WA; Humbert Refuse in Athena and Milton-Freewater; and Sanitary Services, Inc. in Hermiston. Various collection entities provide services to Umatilla County communities and dump at these landfills and transfer stations.

[88] TransCanada, GTN System Map - http://www.gastransmissionnw.com/downloads/documents/system_map.pdf

[89] Loy, W. G., ed. 2001. *Atlas of Oregon*, 2nd Edition. Eugene, OR: University of Oregon Press.

[90] Department of Environmental Quality, Pendleton Office

Synthesis

Built capacity refers to the built environment and infrastructure that supports a community. The various forms of built capital mentioned throughout this section play significant roles in the event of a disaster. Physical infrastructure, including utility and transportation lines, is critical to maintain as these are essential for proper functioning and response during a disaster. Community resilience is directly affected by the quality and quantity of built capital and lack of or poor condition of infrastructure can negatively affect a community's ability to cope, respond and recover from a natural disaster. Initially 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 immediate resources.

Around 15% of Umatilla County's housing stock is made up of mobile homes and other non-permanent housing structures (including boats, RVs, vans, etc.), while roughly eighteen-percent is made up of multi-family dwellings, types of housing that may significantly amplify the human costs of natural hazards and disasters due to the density of occupants. Likewise over 75% of the county's housing was built before 1990, the year Oregon upgraded its seismic building standards to include seismic loading. In terms of infrastructure, Umatilla County's four largest dams are classified as high or significant threat potentials, including The McNary Dam, which was last inspected in 2000. Over 88% of bridges in the region are not distressed, but eight are structurally deficient, and eleven exhibit some other form of deficiency. Most of the county's critical facilities and vital infrastructure are located in Pendleton, Hermiston and Milton Freewater. Aside from I-84 there are a number of alternative highways and roads that may provide service access to people outside of urban areas, or serve as evacuation routes away from the county if necessary in case of an emergency.

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

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 natural hazard mitigation planning, it is important to know what social systems exist within the community because of their existing connections to the public.

Often, mitigation actions identified in the NHMP 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. The presence of these services are more predominantly located in urbanized areas of Umatilla County.

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.

A few methods that social organizations throughout Umatilla County can use to become involved in hazard mitigation.

- Education and Outreach – Organizations can partner with the community to educate the public or provide outreach assistance and materials on natural hazard preparedness and mitigation.
- Information Dissemination – Organizations can partner with the community to provide and distribute hazard-related information to target audiences.
- Plan/Project Implementation – Organizations may have plans and/or policies that may be used to implement mitigation activities or the organization can serve as the coordinating or partner organization to implement mitigation actions.

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. **Table B-17** shows voter turnout in Umatilla County compared to the state for the 2018 and 2020 elections. Umatilla County had a considerably lower turnout in both the 2018 and 2020 elections than the state as a whole. Other indicators such as volunteerism, participation in formal community networks, and community charitable contributions are examples of civic engagement that may increase community connectivity. Residents who want to become involved in their community through volunteering have a number of opportunities available to them throughout the region.

Table B-17 Umatilla County Election Results 2018 & 2020

Voter Information	2018 Mid-term Election		2020 General Election (Presidential)	
	Umatilla County	Oregon	Umatilla County	Oregon
Total Registered Voters	43,600	2,763,105	46,302	2,951,428
Total Ballots Cast	24,573	1,873,891	33,313	2,317,965
Voter Turnout Percentage	56%	68%	72%	79%

Source: Umatilla County Elections Website, http://www.co.umatilla.or.us/elections/results.html.

Cultural Resources

Historic Places

Historic and cultural resources such as historic structures and landmarks can help to define a community and may also be sources for tourism revenue. Protecting these resources from the impact of disasters is important because they have a role in defining and supporting the community.

According to the National Register Bulletin, "a contributing resource is a building, site, structure, or object adds to the historic associations, historic architectural qualities, or archeological values for which a property is significant because it was present during the period of significance, related to the documented significance of the property, and possesses historical integrity or is capable of yielding important information about the period; or it independently meets the National Register criteria."[91] If a structure does not meet these criteria, it is considered to be non-contributing.

Umatilla County has a significant number of historic places listed on the National Register. **Table B-18** identifies that there are 885 eligible/significant (ES), eligible/contributing (EC), non-eligible/out of period (NP), and non-eligible/non-contributing (NC) historic sites in Umatilla County. The table also shows how many of the sites are located in incorporated cities.

Table B-18 Umatilla County Historic Places

Eligible Sites	Total Sites (885)	Located in Incorporated Cities
ES-Significant	66	60
EC-Contributing	643	612
NP-Non-Eligible/Out of Period and NC-Non-Eligible and Non-Contributing	176	174

Source: Oregon Historic Sites Database, http://heritagedata.prd.state.or.us/historic/

Libraries and Museums

Libraries and Museums are other facilities which a community can use to stay connected. There are 13 public libraries of various sizes spread throughout Umatilla County, including the Blue Mountain Community College Library, as well as facilities in most of the county's cities. These facilities serve a critical function in maintaining a sense of community, however library buildings should also be considered as a common place for members of communities to gather during a disaster or hazard event.

Museums can also function in maintaining a sense of community as they provide residents and visitors with the opportunity to explore the past and develop cultural capacity. The Umatilla County Historical Society oversees the operation and development of the Heritage Station Museum in downtown Pendleton. The Umatilla County Historical Society was organized in 1974 to collect and preserve historical objects and stories unique to the Umatilla County region, and use them to

[91] U.S. Department of the Interior, National Park Service, Cultural Resources, *National Register Bulletin 16A: How to Complete the National Register Registration Form*, https://www.nps.gov/nr/publications/bulletins/nrb16a/

strengthen present and future generations' understanding of that history through exhibits and diverse programming. [92]

The Tamástslikt Cultural Institute, located near the City of Pendleton on the Confederated Tribes of Umatilla Indian Reservation, is a unique interpretive center on the historic Oregon Trail, owned and operated by the people now known as the Cayuse, Umatilla, and Walla Walla Tribes. The Cultural Institute embodies the Tribes' effort to bring about understanding, and offers the perspective of the native inhabitants of the Oregon territory during the period when the US was expanding its territory westward.[93]

Several other museums are available throughout the region, which cover additional aspects of the county and surrounding area's history. As with public libraries, it is important to consider museums in the mitigation process for community resilience. These structures should be protected in critical times to preserve cultural heritage, but may also serve as a place of refuge for community members during a disaster event.

Cultural Events

Other such institutions that can strengthen community connectivity are the presence of festivals and organizations that engage diverse cultural interests. Umatilla County is home to local art galleries, museums, Umatilla County Fair and Rodeo, Pendleton Roundup, and multiple community festivals/events that take place throughout the year. These places and events bring some revenue into the community; they also improve cultural competence and enhance the sense of place. Cultural connectivity is important to community resilience, as people may be more inclined to remain in the community because they feel part of the community and local culture.

Community Stability

Residential Geographic Stability and Homeownership

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.[94]

Often homeownership is associated with greater resilience as it is a measure of place attachment and commitment. Homeownership is an indicator that residents will return to a community post-disaster, as these people are economically and socially invested in the community. Similar to communities with higher median household income, homeownership can reflect an increased resource capacity to prepare, respond, and cope with a crisis situation.

Table B-19 identifies housing tenure which is demonstrated by identifying the number of occupied households and within that, the number of owner-occupied and renter occupied households.

[92] Umatilla County Heritage Station Museum, http://www.heritagestationmuseum.org/index.html

[93] Tamástslikt Cultural Institute, http://www.tcimuseum.com/

[94] Cutter, Susan, Christopher Burton, Christopher Emrich, *Disaster Resilience Indicators for Benchmarking Baseline Conditions*, Journal of Homeland Security and Emergency Management, http://resiliencesystem.com/sites/default/files/Cutter_jhsem.2010.7.1.1732.pdf

Table B-19 Homeownership in Umatilla County

Jurisdiction	Occupied Households	Owner Occupied	Percent Owner Occupied	Renter Occupied	Percent Renter Occupied
Umatilla County	27,538	17,518	63.6	10,020	36.4%

Source: U.S. Census Bureau, American Fact Finder, Table DP04, Selected Housing Characteristics, 2013-2017, https://data.census.gov/cedsci/table?q=Selected%20Housing%20Characteristics&g=0100000US_0400000US41_0500000US41059&tid=ACSDP1Y2019.DP04&hidePreview=true Accessed 02/01/21.

Synthesis

Umatilla County has social and cultural resources that work in favor to increase community connectivity and resilience. Sustaining these social and cultural resources through events and awareness campaigns helps to preserve community cohesion and a sense of place. All of the communities have social systems that could help raise awareness of available resources and services for the public. It may be of specific interest to these communities to evaluate social and cultural resources periodically so as to get a sense of what exists, what is needed, and who can provide it.

Political Capacity

Political capacity is recognized as the government and planning structures established within the community. In terms of natural hazard mitigation planning and resilience, it is essential for political capital to encompass diverse government and non-government entities in collaboration. Disaster losses stem from a predictable result of interactions between the physical environment, social and demographic characteristics and the built environment.[95] Resilient political capital involves stakeholders in hazard planning and works towards integrating the Natural Hazard Mitigation Plan with other community plans, so that all planning approaches are consistent.

Government Structure

Umatilla County is governed by a Board of Commissioners consisting of three elected individuals, appointed to four year, overlapping terms, who oversee all county activities with the exception of the Sheriff and the District Attorney. The Commissioners are responsible for preparing and monitoring the county budget; making membership appointments to the numerous county committees and overseeing their activities; as well as adopting and enacting ordinances and policies.

They work closely with other agencies on issues directly affecting agriculture, environment, and economics within Umatilla County as well as providing support and direction to the Umatilla County management team who strive to bring a quality service to the citizens of the county. The Commissioner's office maintains an "open door policy" and welcomes citizens to stop by and share their comments and concerns on any issue relating to Umatilla County livability. The Board of County Commissioners normally meets on the first and third Wednesdays of each month at Pendleton Courthouse to conduct county business.

[95] Mileti, D. 199, *Disaster by Design: a Reassessment of Natural Hazards in the United States,* https://www.researchgate.net/publication/293178738_Disasters_by_Design_A_Reassessment_of_Natural_Hazards_in_the_United_States

The County Courthouse at 216 Fourth Street in downtown Pendleton houses many of the departmental offices for Umatilla County including the County Administrator, Planning and Building Services, Human Resources, Elections, Records and Assessment, and space for public meetings. The County Courthouse also houses the District Attorney and the Civil Division of the Sherriff's office. Public Works and the Road Department are housed in the building at 3920 Westgate Street, while the Sheriff's Office, County Corrections, Emergency Management and the Umatilla County 911 Office are all located in the facility at 4700 NW Pioneer Place in Pendleton.[96]

Offices of Umatilla County government that have a role in hazard mitigation are:

Land Use Planning: The Department of Land Use Planning is responsible for comprehensive land use planning for Umatilla County. Information, assistance and regulatory permits can also be obtained from the department. The type of permits that are processed are burn permits, conditional use permits, comprehensive plan changes, zoning and development permits, and rural addressing. The department also houses the Code Enforcement program.

Public Health: Umatilla County Public Health's goals are to understand the specific health issues, investigate health problems and threats, prevent and or minimize communicable disease outbreaks caused by unsafe food, water, chronic diseases, environmental hazards, injuries, and risky health behaviors. This department works actively in the development of response plans in the event of a public health emergency. The department works closely with local responders and the state and fosters partnerships with public and private health care providers, community and government agencies that all are working toward the betterment of our community. The public health clinics in Umatilla County provide a wide variety of services. Public Health programs include Family Planning, Maternal and Child Health, Women Infants and Children Program (WIC) Immunizations, Vital Statistics, Communicable Disease Prevention and Surveillance, Tobacco Prevention, and Environmental Health.

Public Works: The Road Department is responsible for maintaining all county roads and bridges within Umatilla County. The 44 employees include road, shop crew, office personnel, county surveyor, and weed department crew. The department has five employees at each of its two satellite offices in Milton-Freewater and Stanfield. Umatilla County Public Works maintains approximately 1700 miles of road of which 500 miles are paved, along with 344 bridges of various sizes. The Road Department is funded with Gas Tax, Vehicle Registration Fees, and Forest Service revenues based on timber harvested in Umatilla, Wallowa and Whitman National Forests. Timber sales have declined significantly in recent years, and due to the loss of revenues, Umatilla County is basically in a maintenance mode.[97] However the Public Works Department and its employees have important information about the resilience of the physical aspects of the community. As such the Department can help to prioritize projects for mitigation and should be a key partner in implementation as well.

Sheriff's Office: The Umatilla County Sheriff's Office is the primary criminal law enforcement agency for Umatilla County, working with other law enforcement agencies based in Umatilla County including the Oregon State Police, Umatilla Police, Hermiston Police, Stanfield/Echo Police, Pendleton Police, Pilot Rock Police, Milton-Freewater Police, Tribal Police, and Forest Service Law

[96] Umatilla County Website, Departments - http://www.co.umatilla.or.us/Departments.htm

[97] Umatilla County Public Works, http://www.co.umatilla.or.us/road.htm

Enforcement. The Sheriff's Office also provides law enforcement via contracts with the cities of Athena, Adams, Helix, Weston, and Ukiah.

Emergency Management is housed in this department. The Umatilla County Emergency Management program coordinates and supports the efforts of local governments to prevent, prepare for, respond to and recover from natural and human caused emergencies and disasters. The program has a full-time emergency manager and a part-time administrative assistant.

Participating City Government Structure

Adams: The population of the City of Adams in 2020 was 375 residents. [98] The community is governed by a 5-person city council and a mayor. A city recorder handles most of the administrative functions of the city. The community has a planning commission that handles land use permitting matters and the State of Oregon has jurisdiction over the city's building codes. A public works department oversees the community's water/wastewater systems and street infrastructure. Adams contracts with Umatilla County Sheriff's Office for law enforcement and emergency response is provided by East Umatilla Fire and Rescue.

Athena: The population of the City of Adams in 2020 was 1,170 residents. [99] The community is governed by a 5-person city council and a mayor. A city recorder and assistant handle most of the administrative functions of the city. The community has a planning commission that handles land use permitting matters and the State of Oregon has jurisdiction over the city's building codes. A 2-person public works department oversees the community's water/wastewater systems and street infrastructure. Athena contracts with Umatilla County Sheriff's Office for law enforcement and emergency response is provided by East Umatilla Fire and Rescue.

Echo: The population of the City of Echo in 2020 was 720 residents. [100] The community is governed by a 5-person city council and a mayor. A city administrator handles most of the administrative functions of the city. The community has a planning commission that handles land use permitting matters and the State of Oregon has jurisdiction over the city's building codes. A public works department oversees the community's water/wastewater systems and street infrastructure. Echo contracts with nearby City of Stanfield for law enforcement and emergency response is provided by the Echo Rural Fire Protection District.

Helix: The population of the City of Helix in 2020 was 200 residents. [101] The community is governed by a city council and mayor. A part-time city recorder oversees most of the administrative functions of the city, including land use permitting matters. The State of Oregon has jurisdiction over the city's building codes. A public works department oversees the community's water/wastewater systems and street infrastructure. Helix contracts with Umatilla County for law enforcement and emergency response is provided by East Umatilla Fire and Rescue.

[98] Portland State University Population Research Center, *Coordinated Population Forecast for Umatilla County, its Urban Growth Boundaries (UGBs), and Area Outside UGBs 2018-2068*, dated 6/30/18.

[99] Portland State University Population Research Center, *Coordinated Population Forecast for Umatilla County, its Urban Growth Boundaries (UGBs), and Area Outside UGBs 2018-2068*, dated 6/30/18.

[100] Portland State University Population Research Center, *Coordinated Population Forecast for Umatilla County, its Urban Growth Boundaries (UGBs), and Area Outside UGBs 2018-2068*, dated 6/30/18.

[101] Ibid.

Hermiston: The population of the City of Hermiston in 2020 was 18,775 residents. [102] Hermiston is the largest city in Umatilla County. The community is governed by an 8-person city council and mayor. A city manager and assistant manager oversee department heads and manage the day-to-day decisions. As a larger community, the city has numerous boards and committees within city government including, a parks and recreation committee, planning commission, and public safety committee, just to name a few. The community has a community development department that handles land use permitting matters and city's building program. A public works department oversees the community's water/wastewater systems and street infrastructure. Hermiston has its own police and fire departments.

Milton-Freewater: The population of the City of Milton-Freewater in 2020 was 7,210 residents. [103] The community is governed by a 6-person city council and mayor. A city manager oversees department heads and manages the day-to-day decisions. The city has several boards and committees within city government including a parks and recreation committee and planning commission. The community has a community development department and the State of Oregon has jurisdiction over the city's building codes. A public works department oversees the community's water/wastewater systems and street infrastructure. Milton-Freewater has its own police and fire departments.

Pendleton: The population of the City of Pendleton in 2020 was 17,025 residents. [104] Pendleton is the county-seat of Umatilla County. The community is governed by an 8-person city council and mayor. A city manager oversees department heads and manages the day-to-day decisions. The city has several boards and committees within city government including a parks and recreation committee and planning commission. The community has a community development department that handles land use permitting matters and city's building program. A public works department oversees the community's water/wastewater systems and street infrastructure. Pendleton has its own police and fire departments.

Pilot Rock: The population of the City of Pilot Rock in 2020 was 1,505 residents. [105] The community is governed by a 6-person city council and a mayor. A city recorder handles most of the administrative functions of the city, including land use permitting matters. The State of Oregon has jurisdiction over the city's building codes. A public works department oversees the community's water/wastewater systems and street infrastructure. Pilot Rock has its own police for law enforcement and emergency response is provided by the Pilot Rock Rural Fire Protection District.

Stanfield: The population of the City of Stanfield in 2020 was 2,280 residents. [106] The community is governed by a 6-person city council and a mayor. A city administrator handles most of the administrative functions of the city. The community has a planning commission that handles land use permitting matters and the State of Oregon has jurisdiction over the city's building codes. A public works department oversees the community's water/wastewater systems and street infrastructure. Stanfield has its own police for law enforcement and emergency response is Umatilla County Fire District #1.

[102] Ibid.

[103] Ibid.

[104] Ibid.

[105] Ibid.

[106] Ibid.

Ukiah: The population of the City of Ukiah in 2020 was 240 residents. [107] The community is governed by a 4-person city council and a mayor. A part-time city recorder handles most of the administrative functions of the city. The community contracts with a private consultant for land use permitting matters and the State of Oregon has jurisdiction over the city's building codes. A maintenance department oversees the community's water/wastewater systems and street infrastructure. Ukiah contracts with Umatilla County for law enforcement and emergency response is provided by a volunteer fire department.

Umatilla: The population of the City of Umatilla in 2020 was 7,605 residents. [108] The community is governed by a 6-person city council and mayor. A city manager oversees department heads and manages the day-to-day decisions. The city has several boards and committees within city government including a parks and recreation committee and planning commission. The community has a community development department that oversees planning, economic development, and building codes. A public works department oversees the community's water/wastewater systems and street infrastructure. Umatilla has its own police and fire departments.

Weston: The population of the City of Weston in 2020 was 690 residents. [109] The community is governed by a 4-person city council and a mayor. A city recorder handles most of the administrative functions of the city. The community has a planning commission that handles land use permitting matters and the State of Oregon has jurisdiction over the city's building codes. A public works department oversees the community's water/wastewater systems and street infrastructure. Weston contracts with Umatilla County Sheriff's Office for law enforcement and emergency response is provided by East Umatilla Fire and Rescue.

Participating Special Districts Structure

Umatilla County Soil and Water Conservation District: Umatilla County SWCD, established in 1974 with the consolidation of the West, Southern and East Soil Conservation Districts encompasses the whole of Umatilla County. The Umatilla County Soil and Water Conservation District takes the lead in soil and water conservation throughout Umatilla County by working with urban and rural property owners, operators, public officials, various state and federal agencies, and private organizations. This District believes in the protection, conservation, and improvement of soil and water through their employees' and directors' abilities to plan, assist, and educate. It is their belief that concerns about water quality, water quantity, wetlands, soil erosion, and weed management be addressed while simultaneously respecting the private property rights of the property owner and operator. These concerns are addressed through the District Business Plan and by maintaining existing agreements with the various agencies that work with this District. The District is governed by a 7-person board of directors who oversee a district manager and small staff.[110]

Hermiston Irrigation District (HID): In 1903 the USBR began investigating the possibility of irrigating lands along the lower Umatilla River by gravity flow. During 1903 and 1904 the Umatilla River and its tributaries were surveyed and the most feasible reservoir sites were mapped. Subsequent investigations were made to find a reservoir site on the irrigable lands east of the Umatilla

[107] Ibid.

[108] Ibid.

[109] Ibid.

[110] Umatilla County Soil and Water Conservation District, http://www.umatillacountyswcd.com/whoweare/boardofdirectors.html.

River. These studies resulted in the establishment of the Umatilla Project and identification of the Cold Springs Reservoir site.

The original Umatilla Project was authorized in 1905 under the 1902 Reclamation Act. Most facilities were constructed between 1906 and 1927 to supply water to a total of about 30,000 acres. HID is one of four irrigation districts that make up the Umatilla Project. The Umatilla Project was designed to supply water through a network of canals and pipelines to nearly 25,000 acres. The source of water is the Umatilla River and Cold Springs Reservoir. Construction of HID's facilities began in 1906. The first water delivery from Cold Springs Reservoir was made on March 8, 1908.

During the construction period and up until 1926 the system was operated by USBR as the east division of the Umatilla Project. In 1926 HID was formed and took over operations and maintenance of the system with a repayment contract with USBR. Since the 1926 contract the District has entered into modified contracts with USBR to establish a new payment schedule in 1954 and a boundary adjustment contract in 2003. In addition to these contracts the District has a repayment contract with USBR for the safety of dams' work that was required on Cold Springs Reservoir during the mid 90's, this contract took effect in 1997.

A project called the Umatilla Basin Plan was introduced in 1988 which provides infrastructure and the ability to exchange Umatilla River water for Columbia River water for the benefit of the fishery in the Umatilla River. This is a bucket for bucket exchange with the pumping costs from the Columbia River being paid by Bonneville Power Administration. Although the Umatilla Basin Plan and Exchange do not provide any additional amount of water to HID it does provide a more reliable supply of water and a great benefit to the community.

The district is governed by a 5-person board of directors who oversee the district manager, office staff, and field crew. [111]

Stanfield Irrigation District: Stanfield Irrigation District is a special district that oversees water delivery and maintenance of infrastructure associated with the US Bureau of Reclamation's "Umatilla Project".[112] The Stanfield Irrigation District (SID) was formed in 1923. SID has approximately 240 patrons and a total of 10,850 water righted acres in the district. SID has few residential patrons; most of them are farmers who have from 30 to 1,500 acres. There are a couple of patrons that farm over 2,000 acres each. SID has 3 primary water rights and the oldest water right is from 1905 and comes from the Umatilla River. SID has a 1924 storage water right from the McKay Reservoir. The district has 34 miles of canal and 10 miles of pipeline to maintain. There are a lot of high value crops grown in the district. The primary crops grown are melons, strawberries, potatoes, corn, seed corn, mint, grass, grass seed, and hay. The district is governed by a 5-person board of directors who oversee the district manager, office manager, and 3 field crew. The district was also one of the first districts that's "fish friendly" and has been working with the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) on an Exchange Agreement for the last 20 years.[113]

[111] Annette Kirkpatrick, Hermiston Irrigation District, Manager, personal communication, 3/8/21

[112] U.S. Bureau of Reclamation, Umatilla Basin Project, https://www.usbr.gov/projects/index.php?id=410, accessed 2/23/21

[113] Tiffany Harrell, Stanfield Irrigation District, Office Manager, personal communication, 2/23/21

Walla Walla River Irrigation District: The Walla Walla River Irrigation District (WWRID) was formed in 1995 in order to consolidate the operations of 5 local irrigation districts; the Eastside Ditch Company, the Milton Ditch Company, the Little Walla Walla River Irrigation Union, the Powell Ditch Company and the Pleasantview Ditch Company. The WWRID patrons have some of the oldest water rights in the state of Oregon, some dating back to the late 1860's. The approximately 3,500 acres served by the Walla Walla River Irrigation District is some of the most productive, valuable crop land in the state of Oregon. The primary crops grown in the District include apples, cherries, prunes and wine grapes. The goals of the WWRID are to ensure that agriculture is a viable option for future generations in Milton-Freewater, protect our local economy and continue to be responsible environmental stewards of our natural resources in a way that protects both farmers and fish. The district is governed by a 5-person board of directors who oversee a district manager and several personnel.[114]

Existing Plan & Policies

In Section 4 Plan Implementation and Maintenance, under "Implementing through Existing Program" there is a description noting that Umatilla County and the participating cities and districts have plans, programs, policies, procedures and agencies that may be used to implement mitigation actions. This section and the previous section "Government Structure" provide more detail on that information.

Communities often have existing plans and policies that guide and influence land use, land development, and population growth. 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.[115]

The *2021 Umatilla County NHMP* includes mitigation action items that, when implemented, will reduce the County's, and participating cities' and districts' vulnerability to natural hazards. These mitigation actions are consistent with the goals and objectives of the County's existing plans and policies.

Linking existing plans and policies to the *2021 Umatilla County NHMP* helps identify what resources already exist that can be used to implement the mitigation actions in the NHMP. 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 as well as the cities' and special districts'. In addition to the plans listed in **Table B-20**, the County and Cities also have zoning ordinances (including floodplain development regulations) and building regulations.

[114] Walla Walla River Irrigation District, https://www.wwrid.com/board.htm.

[115] Burby, Raymond J., ed. 1998. *Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities*, https://www.nap.edu/catalog/5785/cooperating-with-nature-confronting-natural-hazards-with-land-use-planning

Table B-20 Existing Plans for Umatilla County, Participating Cities, and Special Districts (Same as Table 4-1)

Jurisdiction	Document	Year
Umatilla County	Code of Ordinances (includes Development Code, Emergency Operations, Smoke Management, Solid Waste etc.)	On-going
Umatilla County	Comprehensive Plan	1983, Amended
Umatilla County	Development Code	1983, Amended
Umatilla County	Transportation System Plan	2002
Umatilla County	Natural Hazards Mitigation Plan	2021 in process, 2014 existing, expired
Umatilla County	Emergency Operations Plan	2012 (Ord. 1991-07, passed December 18, 1991; Ord. 2003-16, passed December 17, 2003; Ord. 2005-16, passed October 5, 2005; Ord. 2009-08, passed October 21, 2009; Ord. 2012-01, passed January 18,2012)
Umatilla County	Community Wildfire Protection Plans: the *West County CWPP* (2006), the *Blue Mountains and Foothills Region CWPP* (2005), and the *Mill Creek and Walla Walla County CWPP* (2017)	2005, 2006, and 2017
Umatilla County	Umatilla County Strategic Plan	2019 updated 2014 original
Umatilla County	Smoke Management Operating Plan	2013
Stanfield Irrigation District	Water Management and Conservation Plan	2010
Hermiston Irrigation District	Umatilla Basin Annual Operating Plan	2016
Hermiston Irrigation District	Umatilla Project Emergency Management Plan	2016
Hermiston Irrigation District	Water Management and Conservation Plan	2018
Umatilla County Soil and Water Conservation District	Annual Plan	Every year
Umatilla County Soil and Water Conservation District	5 Year Business Plan	2020-2025 current

Jurisdiction	Document	Year
Walla Walla River Irrigation District	Walla Walla River Irrigation District's (WWRID) authority is granted by Oregon Revised Statute (ORS). ORS Chapter 545 provides WWRID the framework to implement hazard mitigation projects that are supportive of the district's responsibility to deliver irrigation water to its customers. Although WWRID does not have a local strategic plan, the district does have a set of adopted bylaws that guide the formation and work of the district manager and board of directors.	current
City of Adams	Comprehensive Plan	2013
City of Adams	Development Code	2015
City of Adams	Transportation System Plan	2003
City of Athena	Comprehensive Plan	1978, Amended
City of Athena	Development Code	2013
City of Athena	Transportation System Plan	1999
City of Echo	Comprehensive Plan	2005
City of Echo	Development Code	2010
City of Echo	Transportation System Plan	2001
City of Helix	Comprehensive Plan	2001
City of Helix	Development Code	2001
City of Helix	Transportation System Plan	2001
City of Hermiston	Comprehensive Plan	1992, Amended
City of Hermiston	Development Code	1994, Amended
City of Hermiston	Transportation System Plan	1997, Amended
City of Milton-Freewater	Comprehensive Plan	1978, Amended
City of Milton-Freewater	Development Code	1978, Amended
City of Milton-Freewater	Transportation System Plan	1999, Amended
City of Milton-Freewater	Parks and Recreation Master Plan	2020
City of Pendleton	Comprehensive Plan	1983
City of Pendleton	Development Code	2014, Amended
City of Pendleton	Transportation System Plan	2016
City of Pilot Rock	Comprehensive Plan	2001, Amended

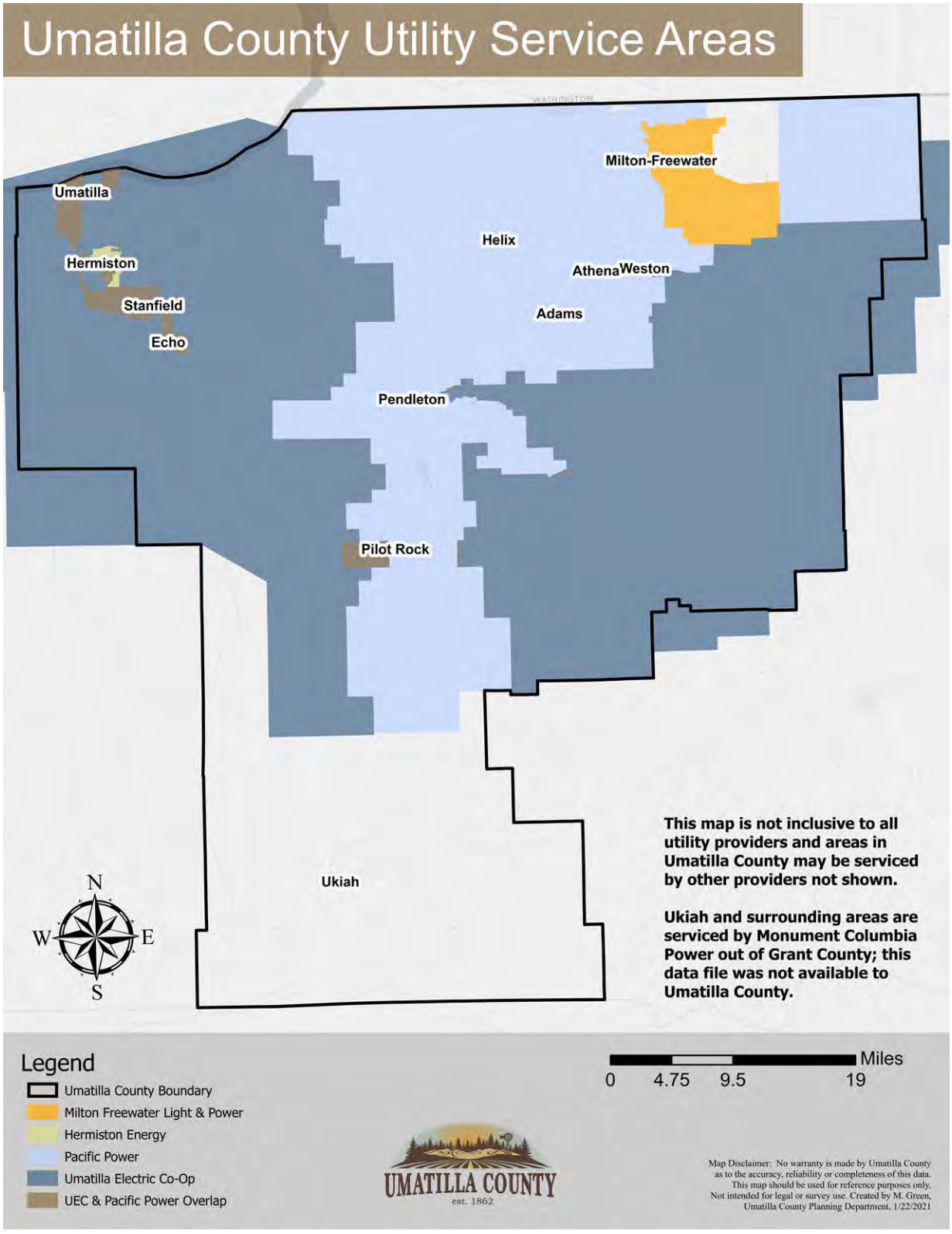
Jurisdiction	Document	Year
City of Pilot Rock	Development Code	2005
City of Pilot Rock	Transportation System Plan	2001
City of Stanfield	Comprehensive Plan	2003, Amended
City of Stanfield	Development Code	2001, Amended
City of Stanfield	Transportation System Plan	2001, Amended
City of Ukiah	Comprehensive Plan	2013
City of Ukiah	Development Code	2011
City of Ukiah	Transportation System Plan	2001
City of Umatilla	Comprehensive Plan	2013, Amended
City of Umatilla	Development Code	1999, Amended
City of Umatilla	Transportation System Plan	2001, Amended
City of Weston	Comprehensive Plan	2001, Amended
City of Weston	Development Code	2001
City of Weston	Transportation System Plan	2001
All	ORS 401.305 - Emergency management agency of city, county or tribal government - 2020 Oregon Revised Statutes (oregonlaws.org)	2020

Source: Bob Waldher, Umatilla County; Tiffany Harrell, Stanfield Irrigation District, personal communication 2/23/21; Umatilla County Emergency Operations Plan, http://www.co.umatilla.or.us/bcc/codes/35.pdf; Umatilla County Strategic Plan, http://www.co.umatilla.or.us/bcc/agendas/Item081204.pdf; Umatilla County Wildfire Protection Plans listed on the website and confirmed by Tom Roberts, Gina Miller, Umatilla County, personal communication, 2/23/21; Umatilla County, personal communication; Kyle Waggoner, Umatilla County Soil and Water Conservation District, personal communication 2/23/21; City of Adams Website, http://www.cityofadamsoregon.com/ordinances.html; City of Athena Website, https://www.cityofathena.com/ordinances/; City of Hermiston Website, https://www.hermiston.or.us/commdev/page/planning-department; City of Ukiah Website, http://www.cityofukiahoregon.com/departments.html#landuseplanning; City of Umatilla Website, https://www.umatilla-city.org/planning; David Slaght, City of Echo, personal communication 3/4/21; Clinton Spencer, City of Hermiston, personal communication 3/4/21; Teri Bacus, City of Pilot Rock, personal communication 3/4/21; Donna Grimes, City of Adams, personal communication 3/5/21; George Cress, City of Pendleton, personal communication 3/5/21; Brandon Seitz, City of Umatilla, personal communication 3/9/21; Benjamin Burgener, City of Stanfield, personal communication 3/9/21;

Synthesis

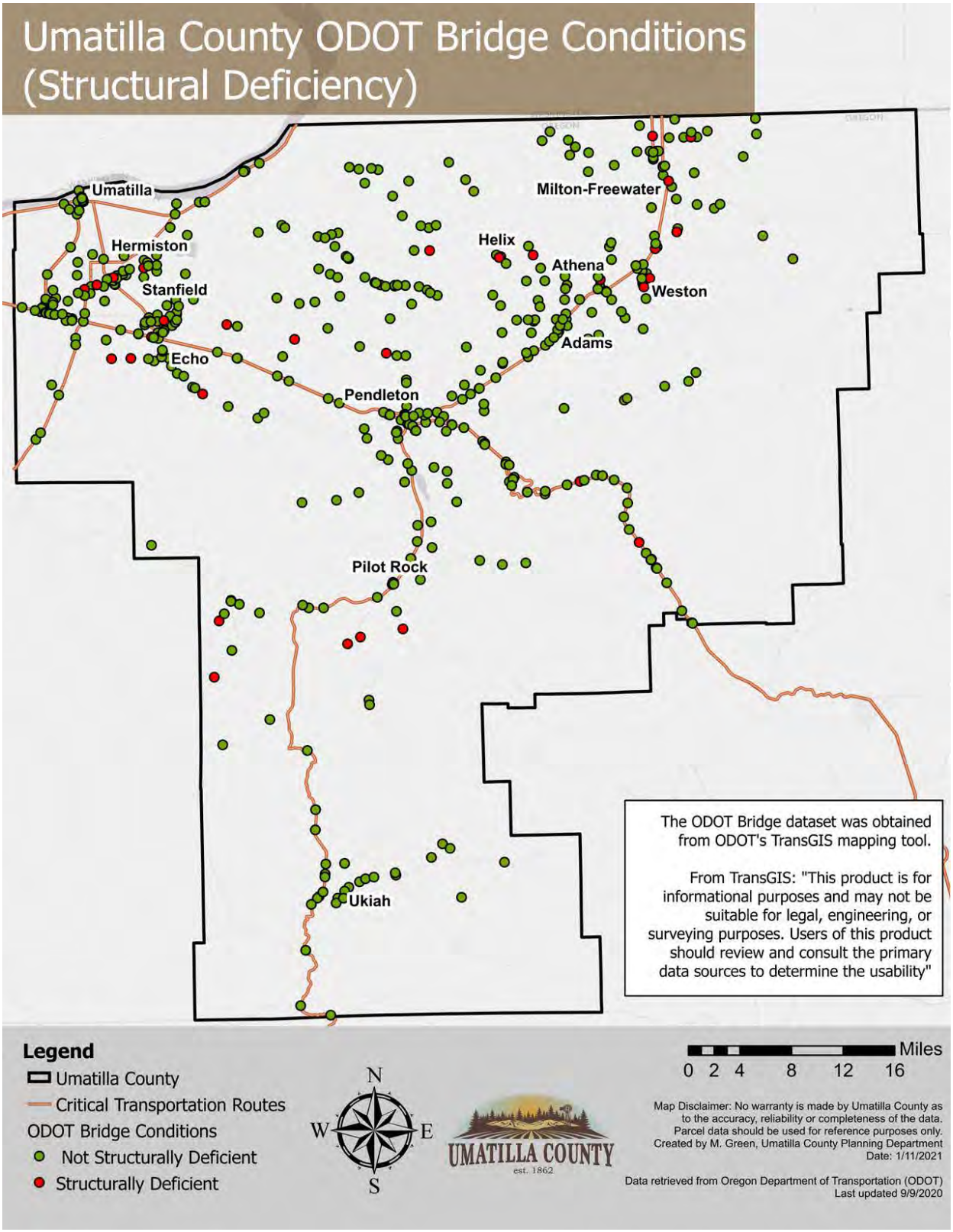
As addressed above, many governmental entities are responsible for work relevant to hazards planning. It is challenging to decipher whether these governmental entities work collaboratively in practice towards strengthening natural hazard mitigation. On a similar note, in short of reviewing each of the relevant policy documents it is questionable whether the documents effectively integrate hazard initiatives into implementation policy. Further analysis is needed to evaluate the effectiveness of political capital in terms of community resilience.

Figure B-25 Umatilla County Utility Service Areas



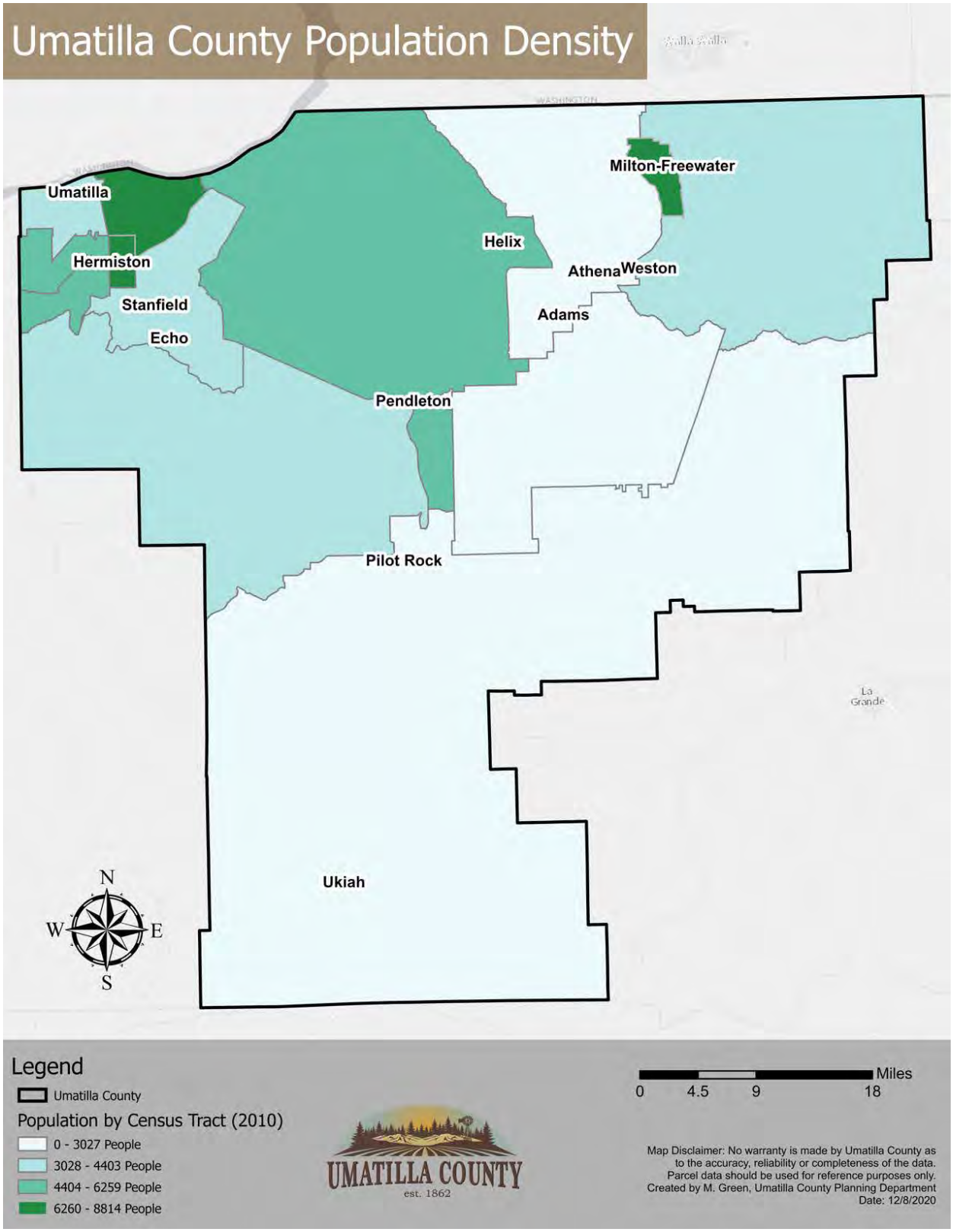
Source: Megan Green, Umatilla County, 1/22/21

Figure B-26 Umatilla County ODOT Bridge Conditions



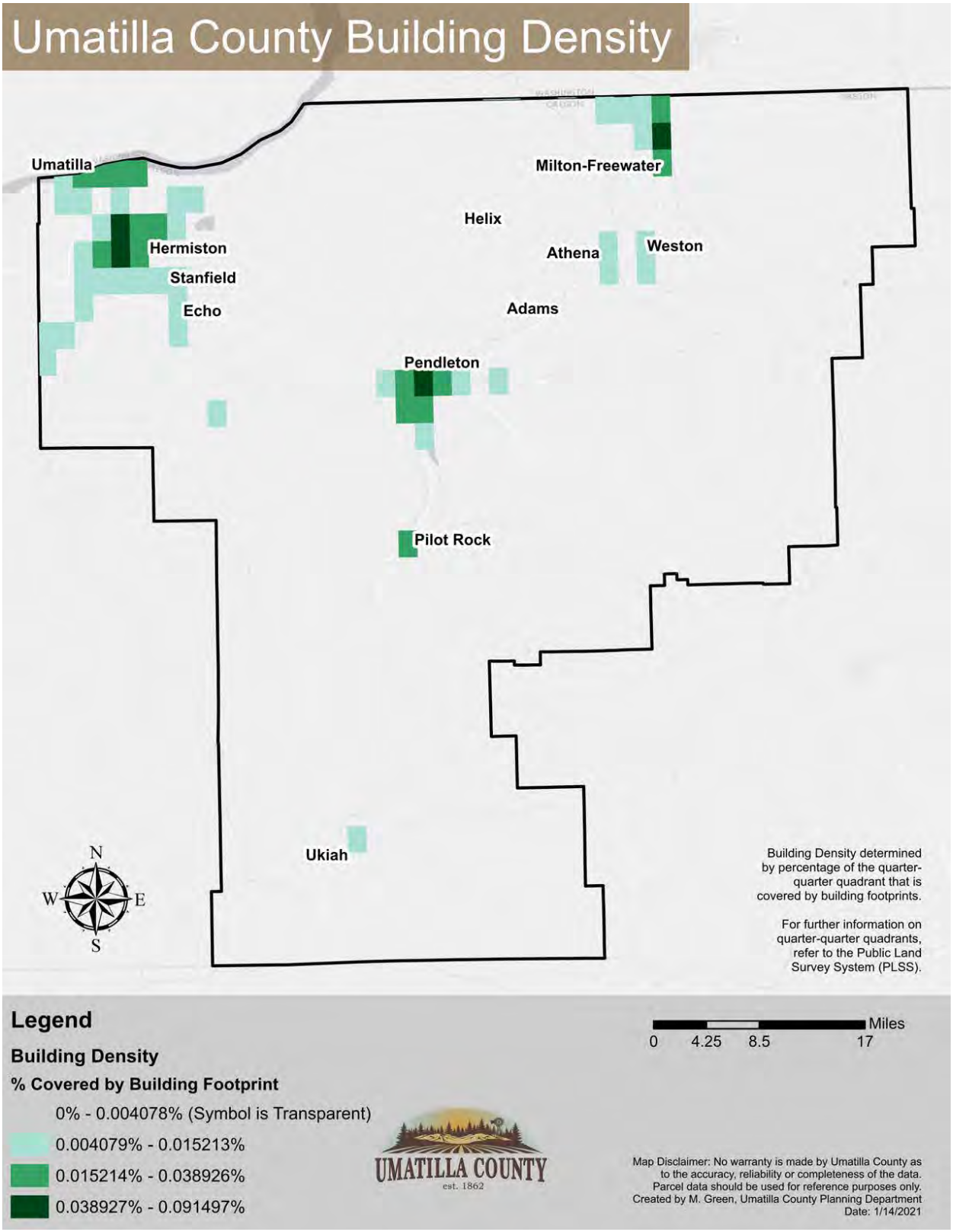
Source: Megan Green, Umatilla County, 9/9/20

Figure B-27 Umatilla County Population Density



Source: Megan Green, Umatilla County, 12/8/20

Figure B-28 Umatilla County Building Density



Source: Megan Green, Umatilla County, 1/14/21

APPENDIX C: ECONOMIC ANALYSIS OF NATURAL HAZARD MITIGATION PROJECTS

This appendix was originally developed by the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center (now the Institute for Policy Research and Engagement or IPRE) and included in the *2014 Umatilla County NHMP*. It has been reviewed and accepted by the Federal Emergency Management Agency (FEMA) as a means of documenting how the prioritization of mitigation actions includes a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and associated costs.

The appendix outlines three approaches for conducting economic analyses of natural hazard mitigation projects:

- the benefit/cost analysis,
- the cost-effectiveness analysis, and
- the STAPLE/E Approach.

The appendix 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: rhe Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon's Office of Emergency Management, 2000), and FEMA 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 economic analysis can be used to evaluate mitigation projects.

Why Evaluate Mitigation Strategies?

Mitigation actions reduce the cost of disasters by minimizing property damage, injuries, and the potential for loss of life, and by reducing emergency response costs. Evaluating possible natural hazard mitigation actions provides decision-makers with an understanding of the potential benefits and costs, 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 such as these three:

- Natural disasters affect all segments of the communities they strike, including individuals, businesses, and public services such as fire, police, utilities, and schools.
- 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.
- 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 in assessing the positive and negative impacts from mitigation actions, and obtaining an instructive benefit/cost comparison.

What are some Economic Analysis Approaches for Evaluating Mitigation Strategies?

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.

Benefit/Cost Analysis

Benefit/cost analysis is a key mechanism used by OEM, FEMA, 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 the mitigation action exceed the cost of the mitigation action. A benefit/cost analysis for a mitigation action can assist communities in determining whether a project is worth undertaking now 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 (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 Actions

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 Actions

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:

- Request cost sharing from public agencies;
- Dispose of the building or land either by sale or demolition;
- Change the designated use of the building or land and change the hazard mitigation compliance requirement; or
- 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 action could be time consuming and impractical. There are approaches for conducting a quick evaluation of the proposed mitigation actions which could be used to identify those that merit more detailed assessment. One of those methods is the STAPLE/E approach.

Using STAPLE/E criteria, mitigation actions can be evaluated quickly. This set of criteria requires the assessment of the mitigation actions based on the Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLE/E) constraints and opportunities of implementing the particular mitigation action 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.

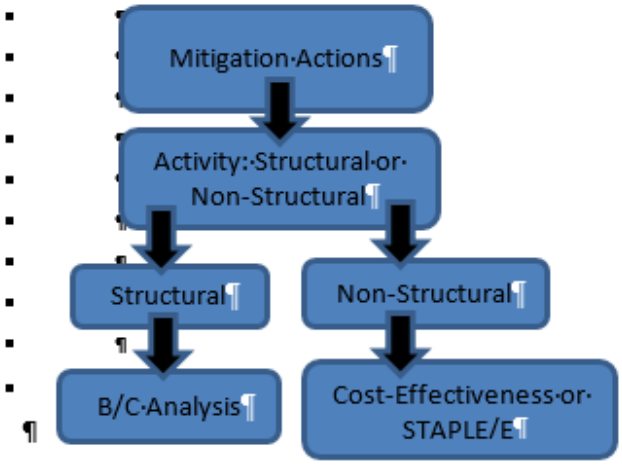
- How will the action impact the environment?
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

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: Tricia Sears, DLCD, November 2018, based on OPDR 2005.

Implementing the Approaches

Below is a framework that could be used in further analyzing the feasibility of implementing prioritized mitigation actions after determining – through the use of one of the economic analysis approached described above – whether or not to implement the mitigation action.

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, and
- 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, and
- 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

These resources were identified in the *2014 Umatilla County NHMP* with this section and may not be widely available at this time.

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 following section includes an abbreviated list of the most common funding sources and resources 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.

Note that FEMA administers three programs that provide funding for eligible mitigation planning and projects that reduces disaster losses and protect life and property from future disaster damages. The three programs are the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) Program, and the Building Resilient Infrastructure and Communities (BRIC) (formerly the Pre-Disaster Mitigation (PDM) Program).
https://www.fema.gov/hazard-mitigation-assistance

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. The HMGP involves a paper application which is first offered to the counties with declared disasters within the past year, then becomes available statewide if funding is still available.
http://www.fema.gov/hazard-mitigation-grant-program

Disaster Loan Assistance

There are four types of loans available from the U.S. Small Business Administration (SBA): home and personal property loans; business physical disaster loans; economic injury loans; and military reservist injury loans. When physical disaster loans are made to homeowners and businesses following disaster declarations by the 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

Building Resilient Infrastructure and Communities (BRIC)

The Pre-Disaster Mitigation (PDM) grant transitioned to the Building Resilient Infrastructure and Communities (BRIC) program for applications in FY 2020. The Pre-Disaster Mitigation (PDM) Program provided funds to state, local, and Tribal entities for hazard mitigation planning and the implementation of mitigation projects before a disaster.

As described on FEMA's website, "Building Resilient Infrastructure and Communities (BRIC) will support states, local communities, tribes and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards…The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency."

The website also describes, "The Building Resilient Infrastructure and Communities (BRIC) program aims to categorically shift the federal focus away from reactive disaster spending and toward research-supported, proactive investment in community resilience. FEMA anticipates BRIC funding projects that demonstrate innovative approaches to partnerships, such as shared funding mechanisms, and/or project design. For example, an innovative project may bring multiple funding sources or in-kind resources from a range of private and public sector stakeholders or offer multiple benefits to a community in addition to the benefit of risk reduction."

https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities

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 *Hazard Mitigation Assistance Guidance*, dated February 27, 2015, available at: https://www.fema.gov/media-library-data/1424983165449-38f5dfc69c0bd4ea8a161e8bb7b79553/HMA_Guidance_022715_508.pdf. Note that guidance regularly changes. Verify that you have the most recent edition. Flood mitigation assistance is usually offered annually; applications are submitted online. Applicants need a user profile approved by the State Hazard Mitigation Officer (SHMO), which should be garnered well before the application period opens.

For Oregon Military Department, Office of Emergency Management (OEM) grant guidance on Federal Hazard Mitigation Assistance, visit:
https://www.oregon.gov/OEM/emresources/Grants/Pages/HMA.aspx

Contact: Amie Bashant, State Hazard Mitigation Officer (SHMO), amie.bashant@state.or.us

State Programs

State Preparedness and Incident Response Equipment (SPIRE)

Oregon House Bill 2687 became effective in August 2017. It established a grant program to distribute emergency preparedness equipment to local governments and other recipients to be used to decrease risk of life and property resulting from an emergency. Items purchased must qualify as capital assets, meaning individual items must cost at least $5,000. A total of $5,000,000 is available to procure emergency preparedness equipment to help Oregon communities prepare, respond, and recover from emergencies. The upcoming deadline for this grant program, as listed on the OEM website (December 4, 2019), is March 1, 2019. The website, as of 2/19/21, has not been updated. Jim Jungling is the contact for the SPIRE program, jim.jungling@state.or.us.
https://www.oregon.gov/oem/emresources/Grants/Pages/Spire.aspx

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

Cooperating Technical Partners

The purpose of the CTP Program is to provide, through a Cooperative Agreement, funds to ensure that partners can perform program management and technical mapping-related activities.

Cooperating Technical Partners Program | FEMA.gov

National Map: Orthoimagery, DOI – USGS

Develops topographic quadrangles for use in mapping of flood and other hazards. https://nationalmap.gov/ortho.html

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/

Oregon Coastal Atlas

The Oregon Coastal Atlas is a multi-group project that is a resource for the various audiences that make up the management constituency of the Oregon Coastal Zone. The project is a depot for traditional and digital information interactive mapping, online geospatial analysis tools, and direct download of various planning and natural resource data sets.

http://www.coastalatlas.net/

Oregon Geospatial Data Clearinghouse

Hosted by the Oregon Geospatial Enterprise Office (GEO), this is an electronic library of Oregon geographic information including Geographic Information System (GIS) data, orthophotography, Digital Elevation Models, and more.

http://www.oregon.gov/DAS/CIO/GEO/Pages/sdlibrary.aspx

Oregon Explorer

The Oregon Explorer – maintained by the Institute for Natural Resources at Oregon State – provides several portals developed to provide background information about many topics relevant to Oregon natural hazards. Tools include the Hazards Reporter, an interactive map viewer created to provide current detailed information for hazards such as flood, tsunami, earthquake, volcano, and landslides for a variety of users including planners.

http://oregonexplorer.info/hazards/OregonsNaturalHazards

Oregon HazVu: Statewide Geohazards Viewer

HazVu provides a way to view many different geohazards in Oregon. You can enter the address for your home, school, business, or public buildings in your area to see what hazards might affect you. You can print the map you create. Geohazards include 100-year flooding; Cascadia Subduction Zone earthquake shaking and tsunami; coastal erosion; volcano; landslide; active faults; earthquake soft soil; and more. Assets include state-owned/leased facilities and public buildings such as schools, police and fire stations, and hospitals, as well as links to seismic assessment reports for these public buildings.

https://www.oregongeology.org/hazvu/

Oregon Risk MAP

Oregon is part of FEMA Region X which covers four states: Alaska, Idaho, Oregon, and Washington. FEMA's Risk Mapping, Assessment, and Planning (Risk MAP) program represents a flood hazard mapping and risk analysis process with planning and mitigation considerations woven throughout. Risk MAP involves: (1) discovering local needs, (2) mapping with better base data, and (3) working with community representatives in assessing risk and vulnerability.

Risk MAP concerns the community, making maps and information available in a way that that makes sense, is understandable, and is usable. Risk MAP is a national program to work with states, tribes, territories, and local communities to evaluate and better understand their current flood risk, as well as the actions that can be taken to mitigate and become more resilient against future risk. More details about the Risk MAP program can be found here, and specific project information can be found by entering your community information into the Projects page.

https://www.fema.gov/risk-map-region-x

RAPTOR - Real Time Assessment and Planning Tool for Oregon

RAPTOR is used within Oregon's emergency management community to view and interact with critical geospatial base maps, aerial imagery, preparedness, hazards, weather and event related data via the internet.

http://www.oregon.gov/oem/emops/Pages/RAPTOR.aspx

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. https://coast.noaa.gov/czm/

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. CDBG Entitlement Program - HUD Exchange

National Cohesive Wildland Fire Management Strategy (USDA, USFS)

The Forest Service has been managing wildland fire on National Forests and Grasslands for more than 100 years. But the Forest Service doesn't do it alone. Instead, the agency works closely with other federal, tribal, state, and local partners. Over the last few decades, the wildland fire management environment has profoundly changed. Longer fire seasons; bigger fires and more acres burned on average each year; more extreme fire behavior; and wildfire suppression operations in the wildland urban interface (WUI) have become the norm.

To address these challenges, the Forest Service and its other federal, tribal, state, and local partners have developed and are implementing a *National Cohesive Wildland Fire Management Strategy* that has three key components: Resilient Landscapes, Fire Adapted Communities, and Safe and Effective Wildfire Response. Wildland Fire | US Forest Service (usda.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.

https://www.rd.usda.gov/about-rd/agencies/rural-utilities-service

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 is necessary. https://www.rd.usda.gov/programs-services

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. HOME: HOME Investment Partnerships Program - HUD Exchange

Disaster Recovery Initiative, HUD

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

Community Development Block Grants (Disaster Recovery Assistance) | HUD.gov / U.S. Department of Housing and Urban Development (HUD)

Emergency Management Performance Grants, FEMA

EMPG grants help state and local governments to sustain and enhance their all-hazards emergency management programs. Emergency Management Performance Grant (EMPG) | FEMA.gov

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. The grant funds projects for wetlands conservation in the United States, Canada, and Mexico.

https://www.grants-gov.net/cfda.php?CFDANumber=15.623

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/ncrc/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/

The Oregon Climate Change Adaptation Framework

The 2010 report provides a framework for the continued development of strategies and plans to address future climate conditions in the state. It is the result of a collaborative effort between Oregon's state agencies, and with support from the Oregon Climate Change Research Institute. The 2010 report is being completely updated, through a process led by DLCD, with 24 participating agencies, in 2019-2021. The 2021 State Agency Climate Change Adaptation Framework was published in January 2021.

https://www.oregon.gov/lcd/Publications/Climate_Change_Adaptation_Framework_2010.pdf

https://www.oregon.gov/lcd/CL/Documents/2021_Climate_Change_Adaptation_Framework_with_Blueprint.pdf

Oregon Climate Assessment Report

The Oregon State Legislature established the Oregon Climate Change Research Institute (OCCRI) within the Department of Higher Education in 2007. OCCRI is a network of over 150 researchers at Oregon State University (OSU), the University of Oregon, Portland State University, Southern Oregon

University, and affiliated federal and state labs. OCCRI is administered by OSU. The *Fifth Oregon Climate Assessment Report* was released on January 5, 2021.

OCAR5.pdf | Powered by Box

Oregon Health Authority (OHA)

Environmental public health works to identify, assess and report on threats to human health from exposure to environmental and occupational hazards, and advise Oregon communities on potential risks where they live, work and play to remain healthy and safe. OHA's Climate and Health Program is working with partners to study, prevent, and plan for the health effects of climate change.

The *Climate and Health Resilience Plan* offers a selection of strategies and policy priorities for state, local, and tribal public health practitioners and partners.

http://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/CLIMATECHANGE/Pages/resilience-plan.aspx

Oregon's *Public Health Hazard Vulnerability Assessment* summarizes public health consequences of Oregon's likely hazards based on the input from local health jurisdictions, tribal health agencies, and emergency management partners.

http://www.oregon.gov/oha/PH/Preparedness/Partners/Documents/OHA%208584%20PH%20Hazard%20Vulnerability.pdf

Oregon Silver Jackets

The Oregon Silver Jackets Team is a subcommittee to the State Interagency Hazard Mitigation Team. It is an interagency team dedicated to establish and strengthen intergovernmental partnerships at the state level as a catalyst in developing comprehensive and sustainable solutions to state flood hazard challenges.

Silver Jackets Website > State Teams > Oregon (nfrmp.us)

USGS Natural Hazards

The USGS Natural Hazards Mission Area includes six science programs: Coastal & Marine Geology, Earthquake Hazards, Geomagnetism, Global Seismographic Network, Landslide Hazards, and Volcano Hazards. Through these programs, the USGS provides alerts and warnings of geologic hazards and interactive maps and data.

http://www.usgs.gov/natural_hazards/

State Interagency Hazard Mitigation Team (IHMT) website

Find IHMT meeting dates and locations, agendas, minutes and meeting materials. The State IHMT is comprised of about 18 state agencies involved with natural hazards. The State IHMT meets quarterly to understand losses arising from natural hazards, coordinate recommended strategies to mitigate loss of life, property, and natural resources, and maintain the Oregon Natural Hazards Mitigation Plan. http://www.oregon.gov/oem/Councils-and-Committees/Pages/IHMT.aspx

Oregon Natural Hazards Mitigation Plan (NHMP)

The Oregon NHMP identifies and prioritizes potential actions throughout Oregon that would reduce our vulnerability to natural hazards. In addition, the plan satisfies the requirements of the Federal Emergency Management Agency (FEMA) to ensure that Oregon is eligible to receive hazard mitigation and disaster assistance funds from the federal government. The current version of the plan was approved in September 2020 and is valid through September 2025. NHMPs must be updated and reapproved every five years by FEMA - so as to remain valid.

https://www.oregon.gov/lcd/NH/Pages/Mitigation-Planning.aspx

Oregon Department of Land Conservation and Development (DLCD) Technical Assistance (TA) Grants

DLCD's General Fund grants are used primarily for Oregon communities' comprehensive planning and plan updates. The fund is divided into functional categories and made available for specific types of projects. During 2019-2021, the categories included Population Forecasting, Technical Assistance, Columbia River Gorge National Scenic Area, Grant Young Memorial Planning Assistance, and a Dispute Resolution grant to the Oregon Consensus Program.

Grant categories have, from time to time, been designated in DLCD's budget notes, in which the Legislature gives direction on how monies should be spent that is applicable only for that particular biennium. DLCD is not aware, at this time (May 2021), if it will be provided with any budget notes. DLCD's *2021-2023 General Fund Grants Allocation Plan* provides the guidance for DLCD's decision-making for the upcoming opportunities for DLCD Technical Assistance Grants. The TA Grants use General Fund money appropriated by the Oregon Legislature for each two-year budgetary period.

https://www.oregon.gov/lcd/CPU/Pages/Community-Grants.aspx

Lindbergh Grants Program

The Lindbergh Foundation is the grant administrator. The purpose is to balance the advance of technology and the preservation of the natural human environment. It can be used for the conservation of natural resources and public outreach/education projects. Grants are awarded to specific projects as they are identified. http://lindberghfoundation.org/

Energy Trust of Oregon

Energy Trust of Oregon is a nonprofit organization committed to delivering clean, affordable energy to 1.7 million utility customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas and Avista, and NW Natural customers. Energy Trust can provide technical support and cash incentives for new construction projects starting at the early design stage to help identify opportunities for improving the energy performance and resilience of the building. Energy Trust also provides information, cash incentives, technical support and resources to support energy investments in existing residential, commercial, municipal, nonprofit, tribal, or institutional sites across the state. Energy Trust has resources to support communities who are addressing potential risks to their energy systems, including aging infrastructure, natural disasters and severe weather events. Complete this form on the website to find out how they can support your project: https://www.energytrust.org/communities/community-contact-us-form/ and www.energytrust.org

APPENDIX E:
FUTURE CLIMATE PROJECTIONS REPORTS

Introduction

This appendix includes one report and one informational flyer provided by the Oregon Climate Change Research Institute (OCCRI): *Future Climate Projections Umatilla County: A Report to the Oregon Land Conservation and Development* dated October 2020 and an informational flyer provided in January 2021. These reports were funded by DLCD using a small portion of the HMGP DR-4432 grant funds obtained by DLCD.

Future Climate Projections
Umatilla County

October 2020

A Report to the Oregon Department of Land Conservation and Development

Prepared by
The Oregon Climate Change Research Institute

Photo credit: Umatilla River at Pendleton Parkway, by Bobjgalindo,
https://commons.wikimedia.org/wiki/File:Umatilla_River_at_Pendleton_Parkway.JPG,
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OCCRI

DLCD

Future Climate Projections: Umatilla County

A report to the Oregon Department of Land Conservation and Development

Prepared by:
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October 2020

Table of Contents

Executive Summary

Climate change is expected to increase the occurrence of most climate-related natural hazards. This report addresses how climate change is expected to influence eleven climate-related natural hazards or risks categorized with very high, high, medium, and low confidence levels.

The risks of heat waves are projected to increase with very high confidence due to strong evidence in published literature, model consensus, and robust theoretical principles for continued increasing temperatures. The majority of risks expected to increase with climate change have high or medium confidence due to moderate to strong evidence and consensus, yet they are influenced by multiple secondary factors in addition to increasing temperatures. Risks with low confidence, while important, show relatively little to no changes due to climate change or the level of evidence is limited. The projected direction of change, along with the level of confidence in the direction of change for each climate change-related natural hazard or risk, is summarized in Table 1. The full report describes the projected changes for each climate metric representing the natural hazard (see Table 2).

Table 1 Summary of projected direction of change along with the level of confidence in climate change-related risk of natural hazard occurrence. Very high confidence means all models agree on the direction of change and there is strong evidence in the published literature. High confidence means most models agree on the direction of change and there is strong to medium evidence in the published literature. Medium confidence means that there is medium evidence and consensus on the direction of change with some caveats. Low confidence means the direction of change is small compared to the range of model responses or there is limited evidence in the published literature.

	Low Confidence	Medium Confidence	High Confidence	Very High Confidence
Risk Increasing ↑	Poor Air Quality	Drought Increased Invasive Species Risk	Heavy Rains Flooding Wildfire Loss of Wetland Ecosystems	Heat Waves
Risk Unchanging =	Windstorms			
Risk Decreasing ↓	Dust Storms			Cold Waves

This report presents future climate projections for Umatilla County relevant to specific natural hazards for the 2020s (2010–2039 average) and 2050s (2040–2069 average) relative to the 1971–2000 average historical baseline. The projections were analyzed for a lower greenhouse gas emissions scenario as well as a higher greenhouse gas emissions scenario, using multiple global climate models. This Executive Summary lists only the projections for the 2050s under the higher emissions scenario. Projections for both time periods and both emissions scenarios can be found within relevant sections of the main report.

Heat Waves

Extreme heat events are expected to increase in frequency, duration, and intensity due to continued warming temperatures.

In Umatilla County, the frequency of hot days per year with temperatures at or above 90°F is projected to increase on average by 29 days, with a range of about 11 to 41 days, by the 2050s under the higher emissions scenario relative to the historical baselines. This average increase represents a more than doubling of hot days relative to the average historical baseline.

In Umatilla County, the temperature of the hottest day of the year is projected to increase on average by nearly 8°F, with a range of about 3 to 11°F, by the 2050s under the higher emissions scenario relative to the historical baselines.

Cold Waves

Cold extremes are still expected to occur from time to time, but with much less frequency and intensity as the climate warms.

In Umatilla County, the frequency of cold days per year at or below freezing is projected to decrease on average by 11 days, with a range of about 5 to 17 days, by the 2050s under the higher emissions scenario relative to the historical baselines. This average decrease represents a future with a little more than half as many cold days per year as in the average historical baseline.

In Umatilla County, the temperature of the coldest night of the year is projected to increase on average by about 9°F, with a range of about 0 to 17°F, by the 2050s under the higher emissions scenario relative to the historical baselines.

Heavy Rains

The intensity of extreme precipitation events is expected to increase in the future as the atmosphere warms and is able to hold more water vapor.

In Umatilla County, the frequency of days with at least ¾" of precipitation is not projected to change substantially. However, the magnitude of precipitation on the wettest day and wettest consecutive five days per year is projected to increase on average by about 19% (with a range of 7% to 39%) and 14% (with a range of -1% to 32%), respectively, by the 2050s under the higher emissions scenario relative to the historical baselines.

In Umatilla County, the frequency of days exceeding a threshold for landslide risk, based on 3-day and 15-day precipitation accumulation, is not projected to change substantially. However, landslide risk depends on a variety of factors and this metric may not reflect all aspects of the hazard.

River Flooding

Mid- to low-elevation areas in Umatilla County's Blue Mountains that are near the freezing level in winter, receiving a mix of rain and snow, are projected to experience an increase in winter flood risk due to warmer winter temperatures causing precipitation to fall more as rain and less as snow.

Drought

Drought conditions, as represented by low summer soil moisture, low spring snowpack, low summer runoff, and low summer precipitation are projected to become more frequent in Umatilla County by the 2050s relative to the historical baseline.

By the end of the 21st century, summer low flows are projected to decrease in the Blue Mountains region putting some sub-basins at high risk for summer water shortage associated with low streamflow.

Wildfire

Wildfire risk, as expressed through the frequency of very high fire danger days, is projected to increase under future climate change. In Umatilla County, the frequency of very high fire danger days per year is projected to increase on average by about 40% (with a range of -14 to +101%) by the 2050s under the higher emissions scenario compared to the historical baseline.

Air Quality

Under future climate change, the risk of wildfire smoke exposure is projected to increase in Umatilla County. The number of "smoke wave" days—days with high concentrations of wildfire-specific particulate matter—is projected to increase by 141% and the intensity of "smoke waves" is projected to increase by 82% by 2046–2051 under a medium emissions scenario compared with 2004–2009.

Windstorms

Limited research suggests very little, if any, change in the frequency and intensity of windstorms in the Pacific Northwest as a result of climate change.

Dust Storms

Limited research suggests that the risk of dust storms in summer would decrease in eastern Oregon under climate change in areas that experience an increase in vegetation cover from the carbon dioxide fertilization effect.

Increased Invasive Species Risk

Warming temperatures, altered precipitation patterns, and increasing atmospheric carbon dioxide levels increase the risk for invasive species, insect and plant pests for forest and rangeland vegetation, and cropping systems.

Loss of Wetland Ecosystems

Freshwater wetland ecosystems are sensitive to warming temperatures and altered hydrological patterns, such as changes in precipitation seasonality and reduction of snowpack.

Introduction

Industrialization has given rise to increasing amounts of greenhouse gas emissions worldwide, which is causing the Earth's climate to warm (IPCC, 2013). The effects of which are already apparent here in Oregon (Dalton *et al.*, 2017; Mote *et al.*, 2019). Climate change is expected to influence the likelihood of occurrence of existing natural hazard events such as heavy rains, river flooding, drought, heat waves, cold waves, wildfire, air quality, and coastal erosion and flooding.

Oregon's Department of Land Conservation and Development (DLCD) contracted with the Oregon Climate Change Research Institute (OCCRI) to perform and provide analysis of the influence of climate change on natural hazards. The geographic scope of this analysis is Umatilla County. This report is funded through the Hazard Mitigation Grant Program (HMGP) grant that DLCD received from FEMA. Outcomes of this analysis include county-specific data, graphics, and text summarizing climate change projections for climate metrics related to each of the natural hazards listed in Table 2. This information will be integrated into the Natural Hazards Mitigation Plan (NHMP) updates for Umatilla County, and can be used in other county plans, policies, and programs. In addition to the county reports, sharing of data, and other technical assistance will be provided to the counties. This report covers climate change projections related to natural hazards within Umatilla County.

Table 2 Natural hazards and related climate metrics evaluated in this project.

Heavy Rains Wettest Day ◆Wettest Five Days Landslide Threshold Exceedance	**Heat Waves** Hottest Day ◆Warmest Night "Hot" Days ◆"Warm" Nights
River Flooding Annual maximum daily flows Atmospheric Rivers Rain-on-Snow Events	**Cold Waves** Coldest Day ◆Coldest Night "Cold" Days ◆"Cold" Nights
Drought Summer Flow ◆Spring Snow Summer Soil Moisture Summer Precipitation	**Air Quality** Unhealthy Smoke Days
Wildfire Fire Danger Days	**Dust Storms**
Windstorms	**Loss of Wetland Ecosystems**
Increased Invasive Species Risk	

Future Climate Projections Background

Introduction

The county-specific future climate projections prepared by OCCRI are derived from 10–20 global climate models (GCM) and two scenarios of future global greenhouse gas emissions. Future climate projections have been "downscaled"—that is, made locally relevant—and summaries of projected changes in the climate metrics in Table 2 are presented for an early 21st century period and a mid 21st century period relative to a historical baseline. (Read more about the data sources in the Appendix.)

Global Climate Models

Global climate models are sophisticated computer models of the Earth's atmosphere, water, and land and how these components interact over time and space according to the fundamental laws of physics (Figure 1). GCMs are the most sophisticated tools for understanding the climate system, but while highly complex and built on solid physical principles, they are still simplifications of the actual climate system. There are several ways to implement such simplifications into a GCM, which results in each one giving a slightly different answer. As such, it is best practice to use at least ten GCMs and look at the average and range of projections across all of them. (Read more about GCMs and uncertainty in the Appendix.)

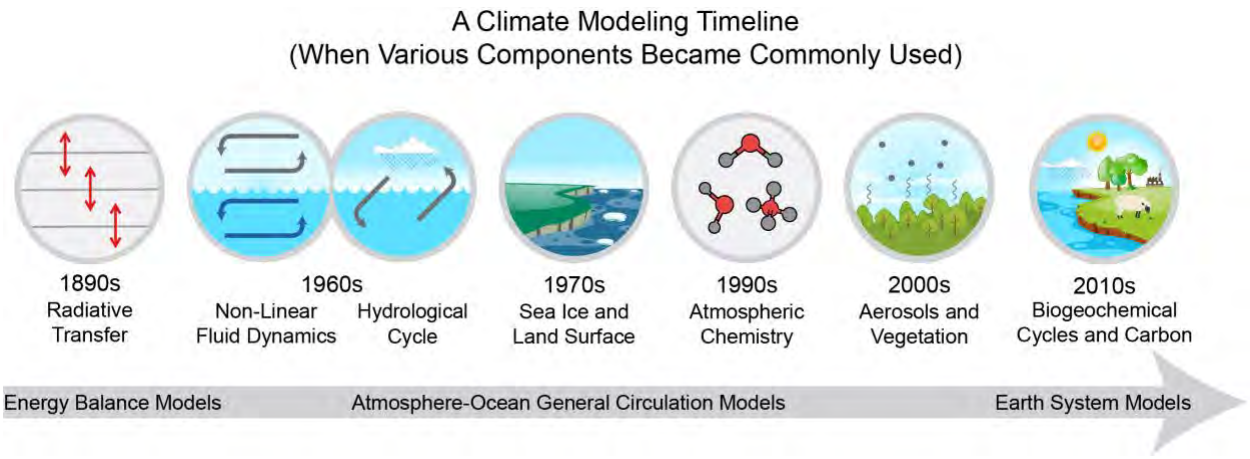

Figure 1 As scientific understanding of climate has evolved over the last 120 years, increasing amounts of physics, chemistry, and biology have been incorporated into calculations and, eventually, models. This figure shows when various processes and components of the climate system became regularly included in scientific understanding of global climate calculations and, over the second half of the century as computing resources became available, formalized in global climate models. (Source: science2017.globalchange.gov)

Greenhouse Gas Emissions

When used to project future climate, scientists give the GCMs information about the quantity of greenhouse gases that the world would emit, then the GCMs run simulations of what would happen to the air, water, and land over the next century. Since the precise amount of greenhouse gases the world will emit over the next century is unknown, scientists use several scenarios of different amounts of greenhouse gas emissions based on plausible societal trajectories. The future climate projections prepared by OCCRI uses emissions pathways called Representative

Concentration Pathways (RCPs). There are several RCPs and the higher global emissions are, the greater the expected increase in global temperature (Figure 2). OCCRI considers a lower emissions scenario (RCP 4.5) and a higher emissions scenario (RCP 8.5) because they are the most commonly used scenarios in published literature and the downscaled data is available for these scenarios. (Read more about emissions scenarios in the Appendix.)

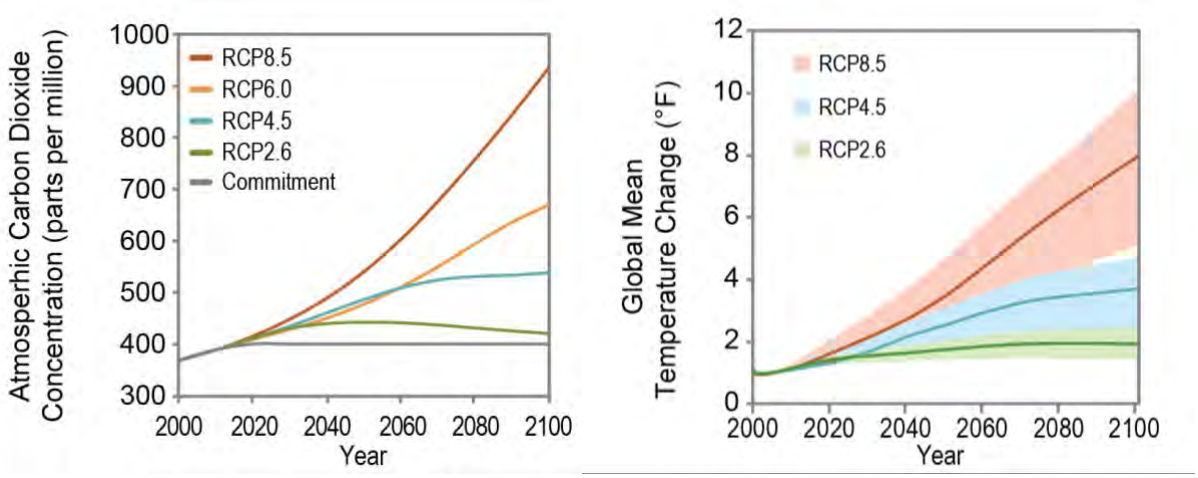

Figure 2 Future scenarios of atmospheric carbon dioxide concentrations (left) and global temperature change (right) resulting from several different emissions pathways, called Representative Concentration Pathways (RCPs), which are considered in the fourth and most recent National Climate Assessment. (Source: science2017.globalchange.gov)

Downscaling

Global climate models simulate the climate across adjacent grid boxes the size of about 60 by 60 miles. To make this coarse resolution information locally relevant, GCM outputs have been combined with historical observations to translate large-scale patterns into high-resolution projections. This process is called statistical downscaling. The future climate projections produced by OCCRI were statistically downscaled to a resolution with grid boxes the size of about 2.5 by 2.5 miles (Abatzoglou and Brown, 2012). (Read more about downscaling in the Appendix.)

Future Time Periods

When analyzing global climate model projections of future climate, it is best practice to compare the average across at least a 30-year period in the future simulations to an average across at least a 30-year period in the historical simulations. The average over a 30-year period in the historical simulations is called the *historical baseline*. For the future climate projections in this report, two 30-year future periods are analyzed in comparison with a 30-year historical baseline (Table 3).

Each of the twenty global climate models simulates historical and future climate slightly differently. Thus, each global climate model has a different historical baseline from which future projections are compared. Because each climate model's historical baseline is slightly different, this report presents the average and range of projected *changes* in the variables relative to each model's own historical baseline (rather than the average and range of future projected absolute values). The average of the twenty historical baselines, called the *average historical baseline*, is also presented to aid in understanding the relative magnitude of projected changes. The average

historical baseline can be combined with the average projected future change to infer the average projected future absolute value of a given variable.

Table 3 Historical and future time periods for presentation of future climate projections

Historical Baseline	Early 21st Century "2020s"	Mid 21st Century "2050s"
1971–2000	2010–2039	2040–2069

How to Use the Information in this Report

Climate change may bring novel conditions that have not been encountered in communities in the recent past. Thus, anticipating future outcomes by considering only past trends and variability may become increasingly unreliable. Future projections from GCMs provide an opportunity to explore a range of plausible outcomes taking into consideration the climate system's complex response to increasing concentrations of greenhouse gases. Considering future projections alongside past trends or hazard events may provide additional insight when updating natural hazard mitigation plans and mitigation actions. It is important to be aware that GCM projections should not be thought of as predictions of what the weather will be like at some specified date in the future, but rather viewed as projections of the long-term statistical aggregate of weather, in other words, "climate", if greenhouse gas concentrations follow some specified trajectory.[1]

The projections of climate variables in this report, both in the direction and magnitude of change, are best used in reference to the historical climate conditions under which a particular asset or system is designed to operate. For this reason, considering the projected changes between the historical and future periods allows one to envision how current systems of interest would respond to climate conditions that are different from what they have been. In some cases, the projected change may be small enough to be accommodated within the existing system. In other cases, the projected change may be large enough to require adjustments, or adaptations, to the existing system. However, engineering or design projects would require a more detailed analysis than what is available in this report.

The information in this report can be used to:

- Explore a range of plausible future outcomes taking into considering the climate system's complex response to increasing greenhouse gases
- Envision how current systems may respond under climate conditions different from those the systems were designed to operate under
- Evaluate potential mitigation actions to accommodate future conditions
- Influence the risk assessment in terms of the likelihood of a particular climate-related hazard occurring.

[1] Read more: https://nca2014.globalchange.gov/report/appendices/faqs#narrative-page-38784

Average Temperature

Oregon's average temperature warmed at a rate of 2.2°F per century during 1895–2019 (National Centers for Environmental Information (NCEI), 2020). Average temperature is expected to continue warming during the 21st century under scenarios of continued global greenhouse gas emissions; the rate of warming depends on the particular emissions scenario (Dalton *et al.*, 2017). By the 2050s (2040–2069) relative to the 1970–1999 historical baseline, Oregon's average temperature is projected to increase by 3.6 °F with a range of 1.8°–5.4°F under a lower emissions scenario (RCP 4.5) and by 5.0°F with a range of 2.9°F–6.9°F under a higher emissions scenario (RCP 8.5) (Dalton *et al.*, 2017). Furthermore, summers are projected to warm more than other seasons (Dalton *et al.*, 2017).

Average temperature in Umatilla County is projected to warm during the 21st century at a similar rate to Oregon as a whole (Figure 3). Projected increases in average temperature in Umatilla County relative to each global climate model's 1971–2000 historical baseline range from 1.2–4.1°F by the 2020s (2010–2039) and 2.1–7.9°F by the 2050s (2040–2069), depending on emissions scenario and climate model (Table 4).

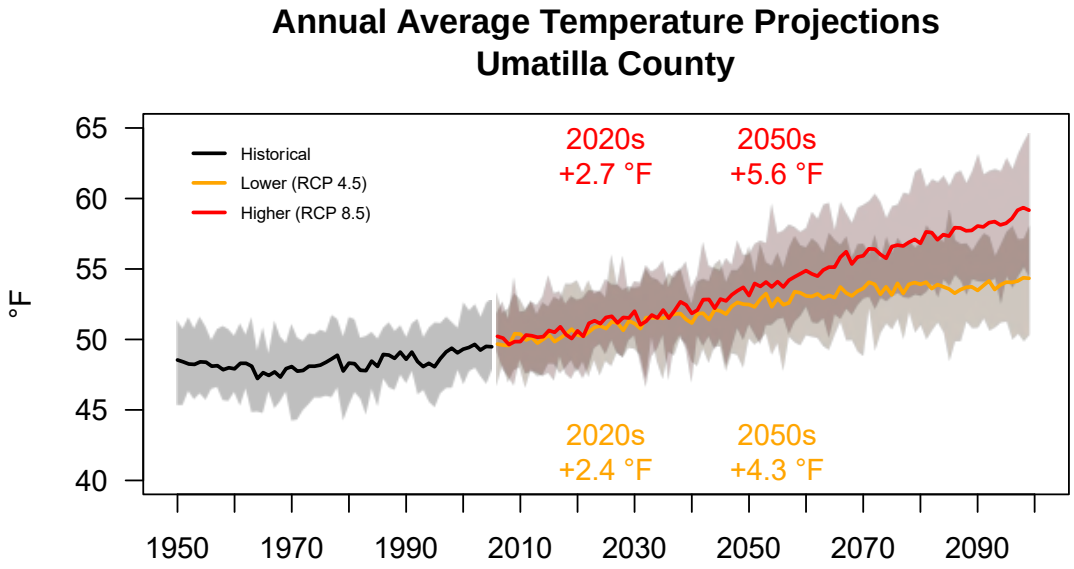

Figure 3 Annual average temperature projections for Umatilla County as simulated by 20 downscaled global climate models under a lower (RCP 4.5) and a higher (RCP 8.5) greenhouse gas emissions scenario. Solid line and shading depicts the 20-model mean and range, respectively. The multi-model mean differences for the 2020s (2010–2039 average) and the 2050s (2040–2069 average) relative to the average historical baseline (1971–2000 average) are shown.

Table 4 Average and range of projected future changes in Umatilla County's average temperature relative to each global climate model's (GCM) historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 GCMs.

	Change by Early 21st Century "2020s"	Change by Mid 21st Century "2050s"
Higher (RCP 8.5)	+2.7°F (1.6 to 3.9)	+5.6°F (3.0 to 7.5)
Lower (RCP 4.5)	+2.4°F (1.1 to 3.9)	+4.3°F (2.0 to 5.9)

Heat Waves

Extreme heat events are expected to increase in frequency, duration, and intensity in Oregon due to continued warming temperatures. In fact, the hottest days in summer are projected to warm more than the change in mean temperature over the Pacific Northwest (Dalton *et al.*, 2017). This report presents projected changes for three metrics of heat extremes for both daytime (maximum temperature) and nighttime (minimum temperature) (Table 5).

Table 5 Heat extreme metrics and definitions

Metric	Definition
Hot Days	Number of days per year maximum temperature is greater than or equal to 90°F
Warm Nights	Number of days per year minimum temperature is greater than or equal to 65°F
Hottest Day	Annual maximum of maximum temperature
Warmest Night	Annual maximum of minimum temperature
Daytime Heat Waves	Number of events per year with at least 3 consecutive days with maximum temperature greater than or equal to 90°F
Nighttime Heat Waves	Number of events per year with at least 3 consecutive days with minimum temperature greater than or equal to 65°F

In Umatilla County, all the extreme heat metrics in Table 5 are projected to increase by the 2020s (2010–2039) and 2050s (2040–2069) under both the lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios (Table 6). For example, for the 2050s under the higher emissions scenario climate models project that the number of hot days greater than or equal to 90°F per year, relative to each model's 1971–2000 historical baseline, would increase by as little as 11 days to as much as 41 days. The average projected increase in the number of hot days per year is 29 days above the average historical baseline of 19 days. This represents a projected more than doubling in the frequency of hot days by the 2050s under the higher emissions scenario.

Likewise, the temperature of the hottest day of the year is projected to increase by as little as 2.9°F to as much as 11.3°F by the 2050s under the higher emissions scenario relative to the models' historical baselines. The average projected increase is 7.9°F above the average historical baseline of 96.8°F. The frequency of daytime heat waves is projected to double on average relative to the average historical baseline of nearly three events. In other words, hot days are projected to become more frequent and the hottest days are projected to become even hotter.

Projected changes in the frequency of extreme heat days (i.e., Hot Days and Warm Nights) are shown in Figure 4. Projected changes in the magnitude of heat records (i.e., Hottest Day and Warmest Night) are shown in Figure 5. Projected changes in the frequency of extreme heat events (i.e., Daytime Heat Waves and Nighttime Heat Waves) are shown in Figure 6.

Table 6 Mean and range of projected future changes in extreme heat metrics for Umatilla County relative to each global climate model's (GCM) historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 GCMs. The average historical baseline across the 20 GCMs is also presented and can be combined with the average projected future change to infer the average projected future absolute value of a given variable. However, the average historical baseline cannot be combined with the range of projected future changes to infer the range of projected future absolute values.

		Change by Early 21st Century "2020s"		Change by Mid 21st Century "2050s"	
	Average Historical Baseline	Lower	Higher	Lower	Higher
Hot Days	18.8 days	+10.7 days (3.5–17.1)	+12.6 days (4.4–17.6)	+20.6 days (7.4–30.8)	+29.2 days (10.8–40.7)
Warm Nights	3.2 days	+3.7 days (0.9–8.4)	+4.3 days (2.1–8.1)	+8.3 days (1.3–18.0)	+14.0 days (3.8–28.7)
Hottest Day	96.8°F	+3.3°F (0.7–5.0)	+3.8°F (1.1–5.4)	+5.9°F (2.2–8.4)	+7.9°F (2.9–11.3)
Warmest Night	65.2°F	+2.5°F (0.9–4.1)	+2.8°F (1.2–3.7)	+4.4°F (1.3–7.0)	+6.4°F (3.3–9.5)
Daytime Heat Waves	2.6 events	+1.1 events (0.5–1.7)	+1.3 events (0.7–1.8)	+1.9 events (1.1–3.1)	+2.3 events (1.3–3.8)
Nighttime Heat Waves	0.4 events	+0.5 events (0.1–1.0)	+0.6 events (0.3–0.9)	+1.1 events (0.1–2.3)	+1.7 events (0.3–3.2)

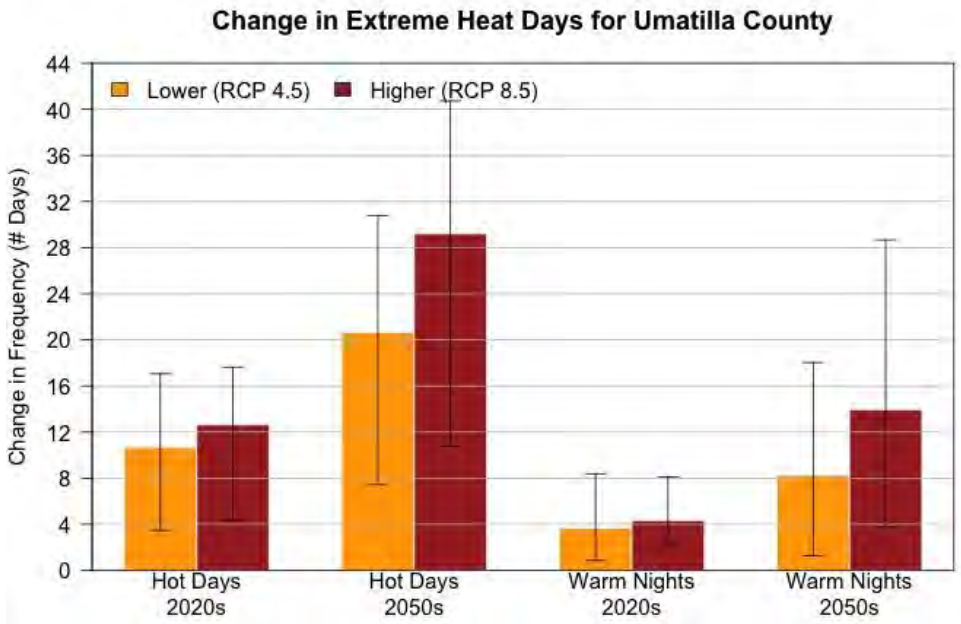

Figure 4 Projected future changes in the number of hot days (left two sets of bars) and number of warm nights (right two sets of bars) for Umatilla County relative to the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models (GCMs). The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs relative to each GCM's historical baseline. Hot days are defined as days with maximum temperature of at least 90°F; warm nights are defined as days with minimum temperature of at least 65°F.

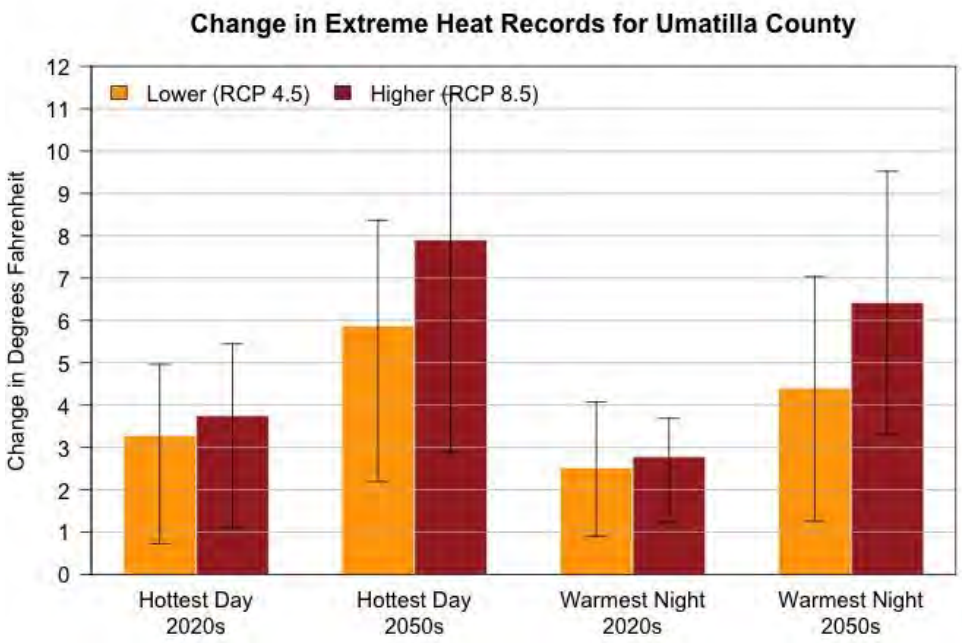

Figure 5 Projected future changes in the hottest day of the year (left two sets of bars) and warmest night of the year (right two sets of bars) for Umatilla County relative to the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models (GCMs). The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs relative to each GCM's historical baseline.

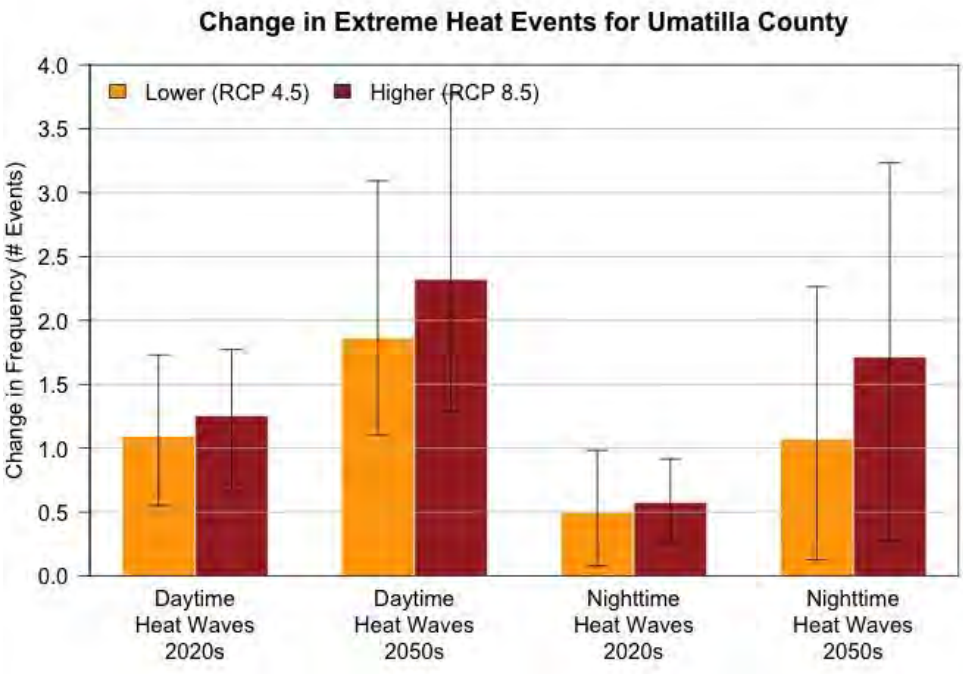

Figure 6 Projected future changes in the number of daytime heat waves (left two sets of bars) and number of nighttime heat waves (right two sets of bars) for Umatilla County relative to the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models (GCMs). The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs relative to each GCM's historical baseline. Daytime heat waves are defined as events with three or more consecutive days with maximum temperature of at least 90°F; nighttime heat waves are defined as events with three or more consecutive days with minimum temperature of at least 65°F.

Key Messages:

⇒ Extreme heat events are expected to increase in frequency, duration, and intensity due to continued warming temperatures.

⇒ In Umatilla County, all the extreme heat metrics in Table 5 are projected to increase by the 2020s and 2050s under both the lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios (Table 6).

⇒ In Umatilla County, the frequency of hot days per year with temperatures at or above 90°F is projected to increase on average by 29 days, with a range of about 11 to 41 days, by the 2050s under the higher emissions scenario relative to the historical baselines. This average increase represents a more than doubling of hot days relative to the average historical baseline.

⇒ In Umatilla County, the temperature of the hottest day of the year is projected to increase on average by nearly 8°F, with a range of about 3 to 11°F, by the 2050s under the higher emissions scenario relative to the historical baselines.

Cold Waves

Over the past century, cold extremes have become less frequent and severe in the Northwest; this trend is expected to continue under future global warming of the climate system (Vose *et al.*, 2017). This report presents projected changes for three metrics of cold extremes for both daytime (maximum temperature) and nighttime (minimum temperature) (Table 7).

Table 7 Cold extreme metrics and definitions

Metric	Definition
Cold Days	Number of days per year maximum temperature is less than or equal to 32°F
Cold Nights	Number of days per year minimum temperature is less than or equal to 0°F
Coldest Day	Annual minimum of maximum temperature
Coldest Night	Annual minimum of minimum temperature
Daytime Cold Waves	Number of events per year with at least 3 consecutive days with maximum temperature less than or equal to 32°F
Nighttime Cold Waves	Number of events per year with at least 3 consecutive days with minimum temperature less than or equal to 0°F

In Umatilla County, the extreme cold metrics in Table 7 are projected to become less frequent or less cold by the 2020s (2010–2039) and 2050s (2040–2069) under both the lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios (Table 8). For example, for the 2050s under the higher emissions scenario climate models project that the number of cold days less than or equal to 32°F per year, relative to each model's 1971–2000 historical baseline, would decrease by at least 5 days to as much as 17 days. The average projected decrease in the number of cold days per year is 11 days relative to the average historical baseline of 18 days. This represents a future with a little more than half as many cold days as before by the 2050s under the higher emissions scenario.

Likewise, the temperature of the coldest night of the year is projected to increase by at most 16.9°F relative to the models' historical baselines. The average projected increase is 9.4°F above the average historical baseline of 0.0°F. The frequency of daytime cold waves is projected to decrease by one event per year on average relative to the average historical baseline of about two events. In other words, cold days are projected to become less frequent and the coldest nights are projected to become warmer.

Projected changes in the frequency of extreme cold days (i.e., Cold Days and Cold Nights) are shown in Figure 7. Projected changes in the magnitude of cold records (i.e., Coldest Day and Coldest Night) are shown in Figure 8. Projected changes in the frequency of extreme cold events (i.e., Daytime Cold Waves and Nighttime Cold Waves) are shown in Figure 9.

Table 8 Mean and range of projected future changes in extreme cold metrics for Umatilla County relative to each global climate model's (GCM) historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 GCMs. The average historical baseline across the 20 GCMs is also presented and can be combined with the average projected future change to infer the average projected future absolute value of a given variable. However, the average historical baseline cannot be combined with the range of projected future changes to infer the range of projected future absolute values.

		Change by Early 21st Century "2020s"		Change by Mid 21st Century "2050s"	
	Average Historical Baseline	Lower	Higher	Lower	Higher
Cold Days	17.8 days	-5.5 days (-9.4 to 0.5)	-7.0 days (-11.6 to -1.6)	-9.4 days (-12.9 to -3.7)	-10.9 days (-16.5 to -5.2)
Cold Nights	1.6 days	-0.5 days (-1.3 to 0.6)	-0.8 days (-1.5 to 0.0)	-1.0 days (-1.9 to -0.1)	-1.1 days (-1.8 to -0.0)
Coldest Day	17.1°F	+2.1°F (-1.3 to 5.3)	+3.7°F (-0.1 to 8.5)	+5.7°F (0.2 to 9.8)	+6.8°F (-0.1 to 12.8)
Coldest Night	0.0°F	+3.3°F (-1.6 to 9.4)	+5.3°F (0.8 to 12.2)	+7.7°F (1.2 to 13.7)	+9.4°F (0.0 to 16.9)
Daytime Cold Waves	2.4 events	-0.7 events (-1.3 to 0.3)	-0.9 events (-1.7 to -0.2)	-1.2 events (-1.9 to -0.6)	-1.4 events (-2.2 to -0.6)
Nighttime Cold Waves	0.2 events	-0.0 events (-0.2 to 0.1)	-0.1 events (-0.2 to 0.1)	-0.1 events (-0.3 to 0.0)	-0.1 events (-0.3 to -0.0)

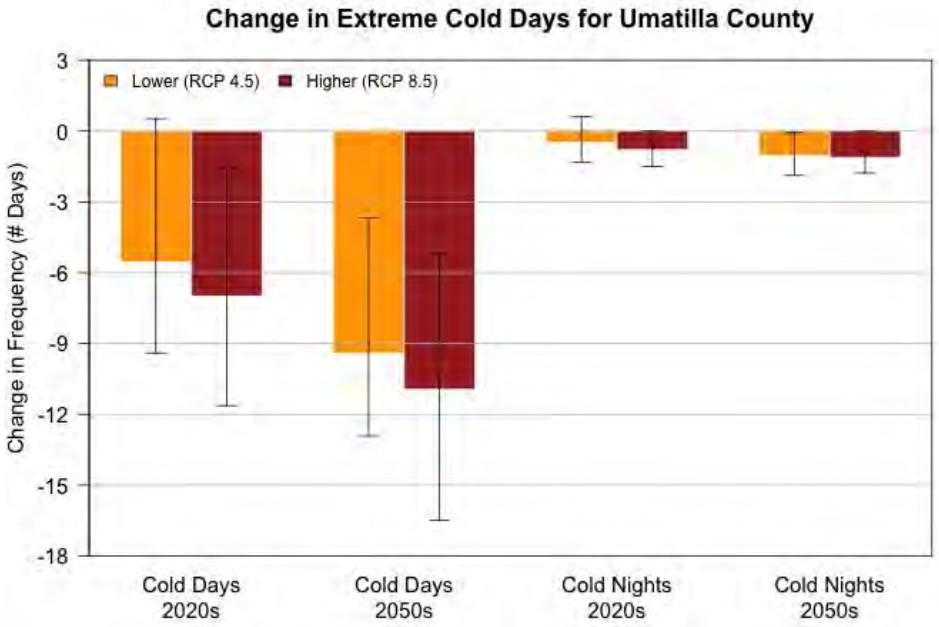

Figure 7 Projected future changes in the number of cold days (left two sets of bars) and number of cold nights (right two sets of bars) for Umatilla County relative to the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models (GCMs). The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs relative to each GCM's historical baseline. Cold days are defined as days with maximum temperature at or below 32°F; cold nights are defined as days with minimum temperature at or below 0°F.

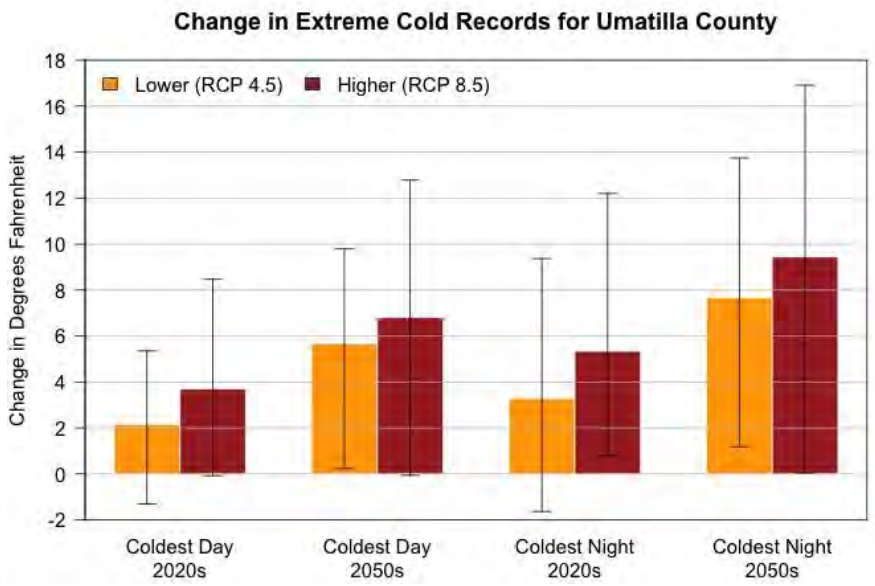

Figure 8 Projected future changes in the coldest day of the year (left two sets of bars) and coldest night of the year (right two sets of bars) for Umatilla County relative to the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models (GCMs). The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs relative to each GCM's historical baseline.

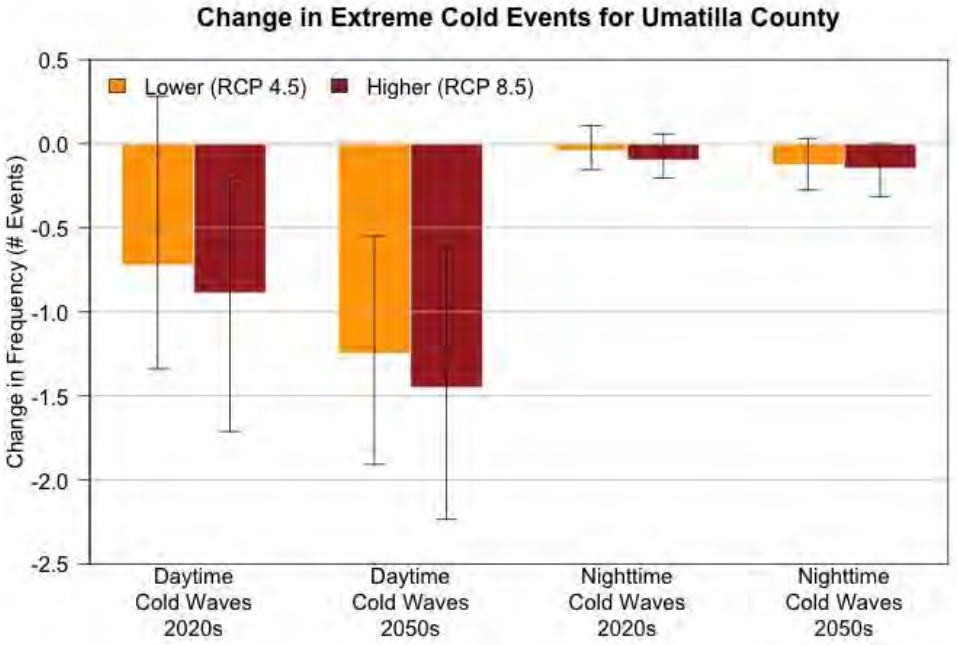

Figure 9 Projected future changes in the number of daytime cold waves (left two sets of bars) and number of nighttime cold waves (right two sets of bars) for Umatilla County relative to the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models (GCMs). The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs relative to each GCM's historical baseline. Daytime cold waves are defined as events with three or more consecutive days with maximum temperature at or below 32°F; nighttime cold waves are defined as events with three or more consecutive days with minimum temperature at or below 0°F.

Key Messages:

⇒ Cold extremes are still expected to occur from time to time, but with much less frequency and intensity as the climate warms.

⇒ In Umatilla County, the extreme cold metrics in Table 7 are projected to become less frequent or less cold by the 2020s and 2050s under both the lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios (Table 8).

⇒ In Umatilla County, the frequency of cold days per year at or below freezing is projected to decrease on average by 11 days, with a range of about 5 to 17 days, by the 2050s under the higher emissions scenario relative to the historical baselines. This average decrease represents a future with a little more than half as many cold days per year as in the average historical baseline.

⇒ In Umatilla County, the temperature of the coldest night of the year is projected to increase on average by about 9°F, with a range of about 0 to 17°F, by the 2050s under the higher emissions scenario relative to the historical baselines.

Heavy Rains

There is greater uncertainty in future projections of precipitation-related metrics than temperature-related metrics. This is because of the large natural variability in precipitation patterns and the fact that the atmospheric patterns that influence precipitation are manifested differently across GCMs. From a global perspective, mean precipitation is likely to decrease in many dry regions in the sub-tropics and mid-latitudes and increase in many mid-latitude wet regions (IPCC, 2013). That boundary between mid-latitude increases and decreases in precipitation is positioned a little differently for each GCM, which results in some models projecting increases and others decreases in Oregon (Mote *et al.*, 2013).

In Oregon, observed precipitation is characterized by high year-to-year variability and future precipitation trends are expected to continue to be dominated by this large natural variability. On average, summers in Oregon are projected to become drier and other seasons to become wetter resulting in a slight increase in annual precipitation by the 2050s (2040–2069). However, some models project increases and others decreases in each season (Dalton *et al.*, 2017).

Extreme precipitation events in the Pacific Northwest are governed both by atmospheric circulation and by how it interacts with complex topography (Parker and Abatzoglou, 2016). Atmospheric rivers—long, narrow swaths of warm, moist air that carry large amounts of water vapor from the tropics to mid-latitudes—generally result in coherent extreme precipitation events west of the Cascade Range, while closed low pressure systems often lead to isolated precipitation extremes east of the Cascade Range (Parker and Abatzoglou, 2016).[2]

Observed trends in the frequency of extreme precipitation events across Oregon have depended on the location, time frame, and metric considered, but overall the frequency has not changed substantially. As the atmosphere warms, it is able to hold more water vapor that is available for precipitation. As a result, the frequency and intensity of extreme precipitation events are expected to increase in the future (Dalton *et al.*, 2017), including atmospheric river events (Kossin *et al.*, 2017). In addition, regional climate modeling results suggest a weakened rain shadow effect in winter projecting relatively larger increases in precipitation east of the Cascades and smaller increases west of the Cascades in terms of both seasonal precipitation totals and precipitation extremes (Mote *et al.*, 2019).

This report presents projected changes for four metrics of precipitation extremes (Table 9).

[2] Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)

Table 9 Precipitation extreme metrics and definitions

Metric	Definition
Wettest Day	Annual maximum 1-day precipitation per water year
Wettest Five-Days	Annual maximum 5-day precipitation total per water year
Wet Days	Number of days per year with precipitation greater than 0.75 inches
Landslide Risk Days	Number of days per water year exceeding the USGS landslide threshold[3]: https://pubs.er.usgs.gov/publication/ofr20061064 o P3/(3.5-.67*P15)>1, where: ▪ P3 = Previous 3-day precipitation accumulation ▪ P15 = 15-day precipitation accumulation prior to P3

In Umatilla County, the magnitude of precipitation on the wettest day and wettest consecutive five days is projected to increase on average by the 2020s (2010–2039) and 2050s (2040–2069) under both the lower and higher emissions scenarios (Table 10). However, some models project decreases in the wettest consecutive five days in all time periods and scenarios.

For the 2050s under the higher emissions scenario, climate models project that the magnitude, or amount, of precipitation on the wettest day of the year, relative to each model's 1971–2000 historical baseline, would increase by as little as 7.0% to as much as 38.8%. The average projected percent increase in the amount of precipitation on the wettest day of the year is 19.0% above the average historical baseline of 0.88 inches.

For the magnitude of precipitation on the wettest consecutive five days of the year, some models project decreases by as much as 1.4% while other models project increases by as much as 32.1% for the 2050s under the higher emissions scenario. The average projected percent change in the amount of precipitation on the wettest consecutive five days is an increase of 13.7% above the average historical baseline of 2.07 inches.

The average number of days per year with precipitation greater than ¾" is projected to increase only by about one day per year by the 2050s under the higher emissions scenario relative to the average historical baseline of about two days per year.

Landslides are often triggered by rainfall when the soil becomes saturated. This report analyzes a cumulative rainfall threshold based on the previous 3-day and 15-day precipitation accumulation as a surrogate for landslide risk. For Umatilla County, the average number of days per year exceeding the landslide risk threshold is projected to increase on average by one day per year by the 2050s under the higher emissions scenario relative to the average historical baseline of three days per year. Landslide risk depends on a variety of site-specific factors and this metric may not reflect all aspects of the hazard. It is important to note that this particular landslide threshold was developed for Seattle, Washington and may or may not have similar applicability to other locations.

[3] This threshold was developed for Seattle, Washington and may or may not have similar applicability to other locations.

Projected changes in the magnitude of extreme precipitation events (i.e., Wettest Day and Wettest Five-Days) are shown in Figure 10. Projected changes in the frequency of extreme precipitation events (i.e., Wet Days and Landslide Risk Days) are shown in Figure 11.

Table 10 Mean and range of projected future changes in extreme precipitation metrics for Umatilla County relative to each global climate model's (GCM) historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 GCMs. The average historical baseline across the 20 GCMs is also presented and can be combined with the average projected future change to infer the average projected future absolute value of a given variable. However, the average historical baseline cannot be combined with the range of projected future changes to infer the range of projected future absolute values.

		Change by Early 21st Century "2020s"		Change by Mid 21st Century "2050s"	
	Average Historical Baseline	Lower	Higher	Lower	Higher
Wettest Day	0.88"	+13.5% (6.9 to 23.6)	+11.7% (-1.7 to 23.2)	+15.6% (3.6 to 26.0)	+19.0% (7.0 to 38.8)
Wettest Five-Days	2.07"	+9.6% (-1.4 to 25.4)	+7.5% (-1.9 to 20.5)	+11.2% (-1.2 to 26.3)	+13.7% (-1.4 to 32.1)
Wet Days	2.4 days	+0.4 days (-0.2 to 0.8)	+0.2 days (-0.2 to 0.8)	+0.6 days (0.0 to 0.9)	+0.7 days (0.1 to 1.5)
Landslide Risk Days	3.2 days	0.5 days (-0.2 to 1.4)	0.4 days (-0.7 to 1.8)	0.7 days (-0.3 to 1.5)	1.0 days (-0.2 to 2.6)

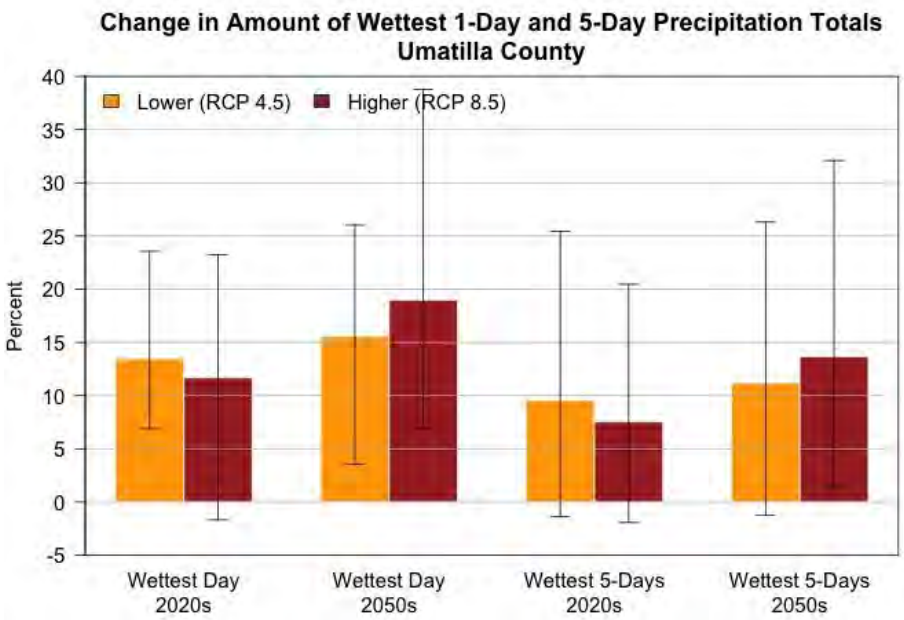

Figure 10 Projected future changes in the wettest day of the year (left two sets of bars) and wettest consecutive five days of the year (right two sets of bars) for Umatilla County relative to the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models (GCMs). The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs relative to each GCM's historical baseline.

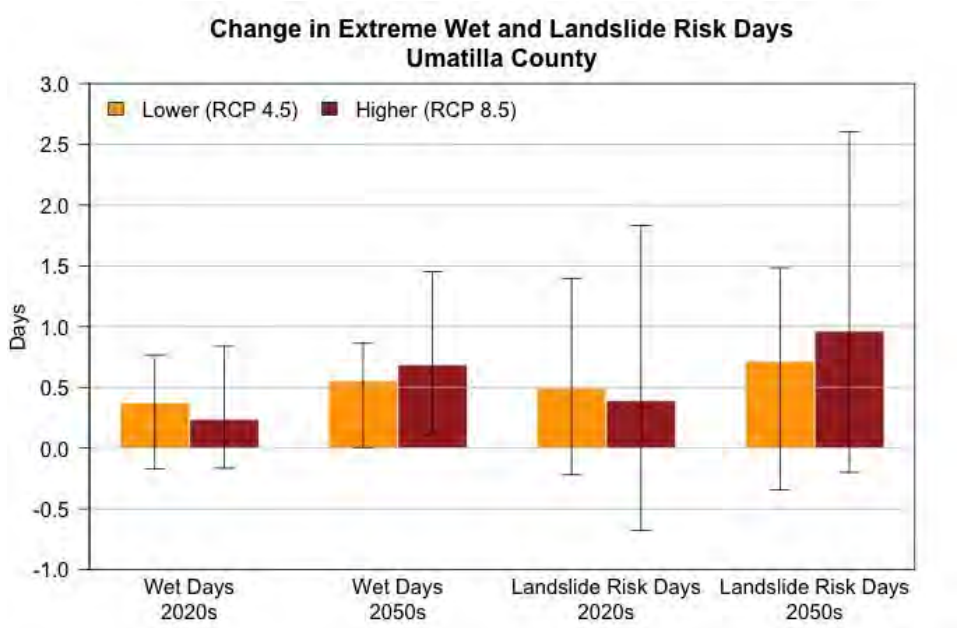

Figure 11 Projected future changes in the frequency of wet days (left two sets of bars) and landslide risk days (right two sets of bars) for Umatilla County relative to the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models (GCMs). The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs relative to each GCM's historical baseline.

Key Messages:

⇒ The intensity of extreme precipitation events is expected to increase in the future as the atmosphere warms and is able to hold more water vapor.

⇒ In Umatilla County, the frequency of days with at least ¾" of precipitation is not projected to change substantially. However, the magnitude of precipitation on the wettest day and wettest consecutive five days per year is projected to increase on average by about 19% (with a range of 7% to 39%) and 14% (with a range of -1% to 32%), respectively, by the 2050s under the higher emissions scenario relative to the historical baselines.

⇒ In Umatilla County, the frequency of days exceeding a threshold for landslide risk, based on 3-day and 15-day precipitation accumulation, is not projected to change substantially. However, landslide risk depends on a variety of factors and this metric may not reflect all aspects of the hazard.

River Flooding

Future streamflow magnitude and timing in the Pacific Northwest is projected to shift toward higher winter runoff, lower summer and fall runoff, and an earlier peak runoff, particularly in snow-dominated regions (Raymondi *et al.*, 2013; Naz *et al.*, 2016).[4] These changes are expected to result from warmer temperatures causing precipitation to fall more as rain and less as snow, in turn causing snow to melt earlier in the spring; and in combination with increasing winter precipitation and decreasing summer precipitation (Dalton *et al.*, 2017; Mote *et al.*, 2019).

The projected change in the mean monthly hydrograph of the Columbia River at McNary is shown in Figure 12 and of the Umatilla River at Pendleton is shown in Figure 13. On the Columbia River at McNary, the monthly hydrograph is characteristic of a snow-dominated basin with peak flows during the late spring snowmelt season (Figure 12). On the Umatilla River at McNary, the monthly hydrograph is characteristic of a mixed rain-snow basin with peak flows during the early to mid-spring snowmelt season and a smaller peak in late fall to early winter reflecting rainfall contributions early in the water year (Figure 13). By the 2050s (2040–2069), under both emissions scenarios, the peak streamflow in both rivers is projected to shift earlier in the spring as warmer temperatures cause the snowpack to melt earlier. In addition, winter streamflow is projected to increase due to increased winter precipitation and that precipitation falling more as rain than snow.

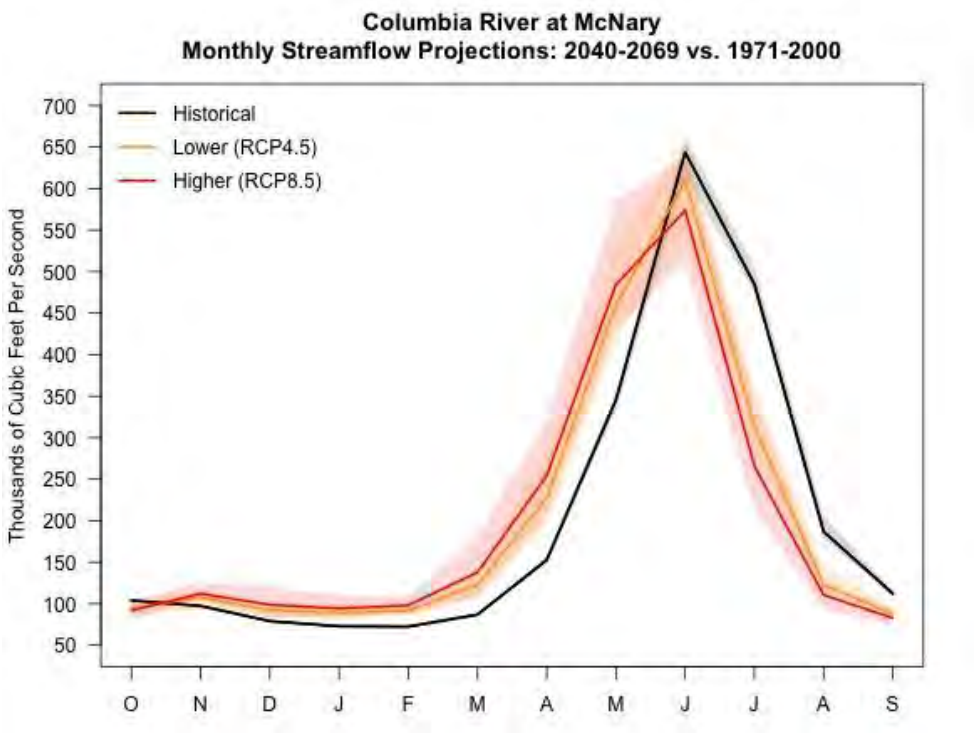

Figure 12 Simulated historical and future bias-corrected mean monthly non-regulated streamflow at the Columbia River at McNary for 2040–2069 compared to 1971–2000. Solid lines and shading depict the mean and range across ten global climate models. (Data source: Integrated Scenarios of the Future Northwest Environment, https://climatetoolbox.org/tool/future-streamflows)

[4] Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)

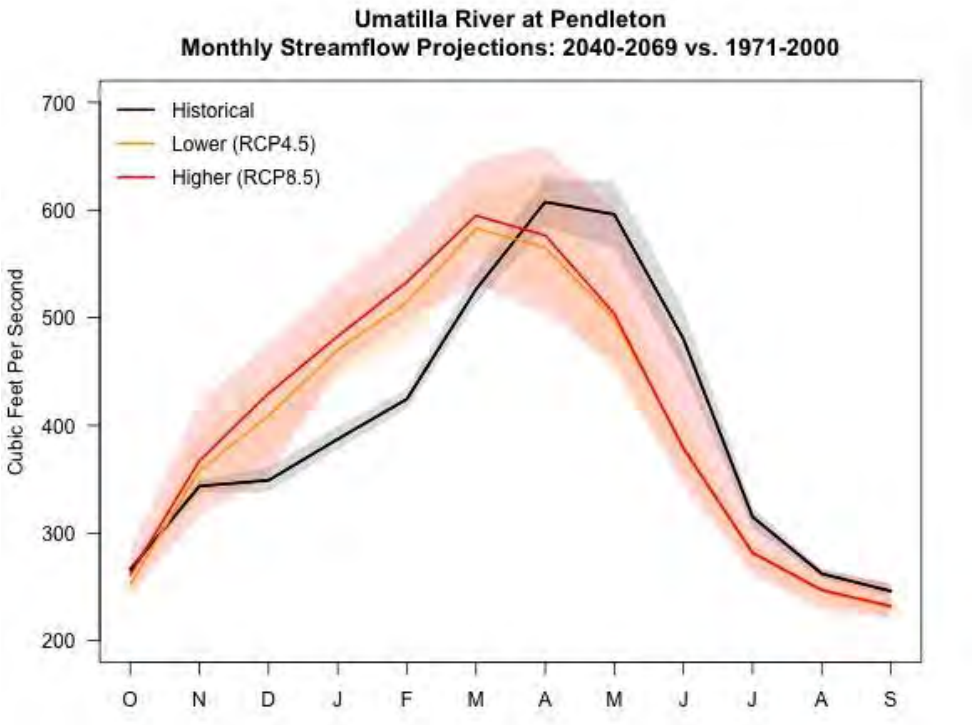

Figure 13 Simulated historical and future bias-corrected mean monthly non-regulated streamflow at the Umatilla River at Pendleton for 2040–2069 compared to 1971–2000. Solid lines and shading depict the mean and range across ten global climate models. (Data source: Integrated Scenarios of the Future Northwest Environment, https://climatetoolbox.org/tool/future-streamflows)

Warming temperatures and increased winter precipitation are expected to increase flood risk for many basins in the Pacific Northwest, particularly mid- to low-elevation mixed rain-snow basins with near freezing winter temperatures (Tohver *et al.*, 2014). The greatest changes in peak streamflow magnitudes are projected to occur at intermediate elevations in the Cascade Range and the Blue Mountains (Safeeq *et al.*, 2015). Recent advances in regional hydro-climate modeling support this expectation, projecting increases in extreme high flows for most of the Pacific Northwest, especially west of the Cascade Crest (Salathé *et al.*, 2014; Najafi and Moradkhani, 2015; Naz *et al.*, 2016). One study, using a single climate model, projects flood risk to increase in the fall due to earlier, more extreme storms, including atmospheric river events, and to a shift of precipitation from snow to rain (Salathé *et al.*, 2014).[5] Across the western US, the 100-year and 25-year peak flow magnitudes—major flooding events—are projected to increase at a majority of streamflow sites by the 2070–2099 period compared to the 1971–2000 historical baseline under the higher emissions scenario (RCP 8.5) (Maurer *et al.*, 2018).

In parts of the Blue Mountains (the Wallowa Mountains, Hells Canyon Wilderness Area, and northeast Wallowa-Whitman National Forest), flood magnitude for the 1.5-year return period event is expected to increase by the end of the 21st century under a medium emission scenario (SRES-A1B)[6], particularly in mid-elevation areas, as precipitation falls more as rain and less as snow (Clifton *et al.*, 2018) (Figure 14). The 1.5-year return period event has a 67% probability of occurrence in a given year and is indicative of flooding levels that can begin to cause damage to

[5] Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)
[6] The medium emissions pathway (SRES-A1B) is from an earlier generation of emissions scenarios and it is most similar to RCP 6.0 from Figure 2.

roads. An increase in flood magnitude for a specified flood frequency implies an increase in flood frequency for a given flood magnitude. Figure 14 shows projections of flood magnitude change for the 1.5-year return period event for the 2080s compared to a historical baseline. Unfortunately, this study does not project changes in flood magnitude for the Blue Mountains region for the 2020s and 2050s; projected changes can be expected to be of a similar direction but a smaller magnitude.

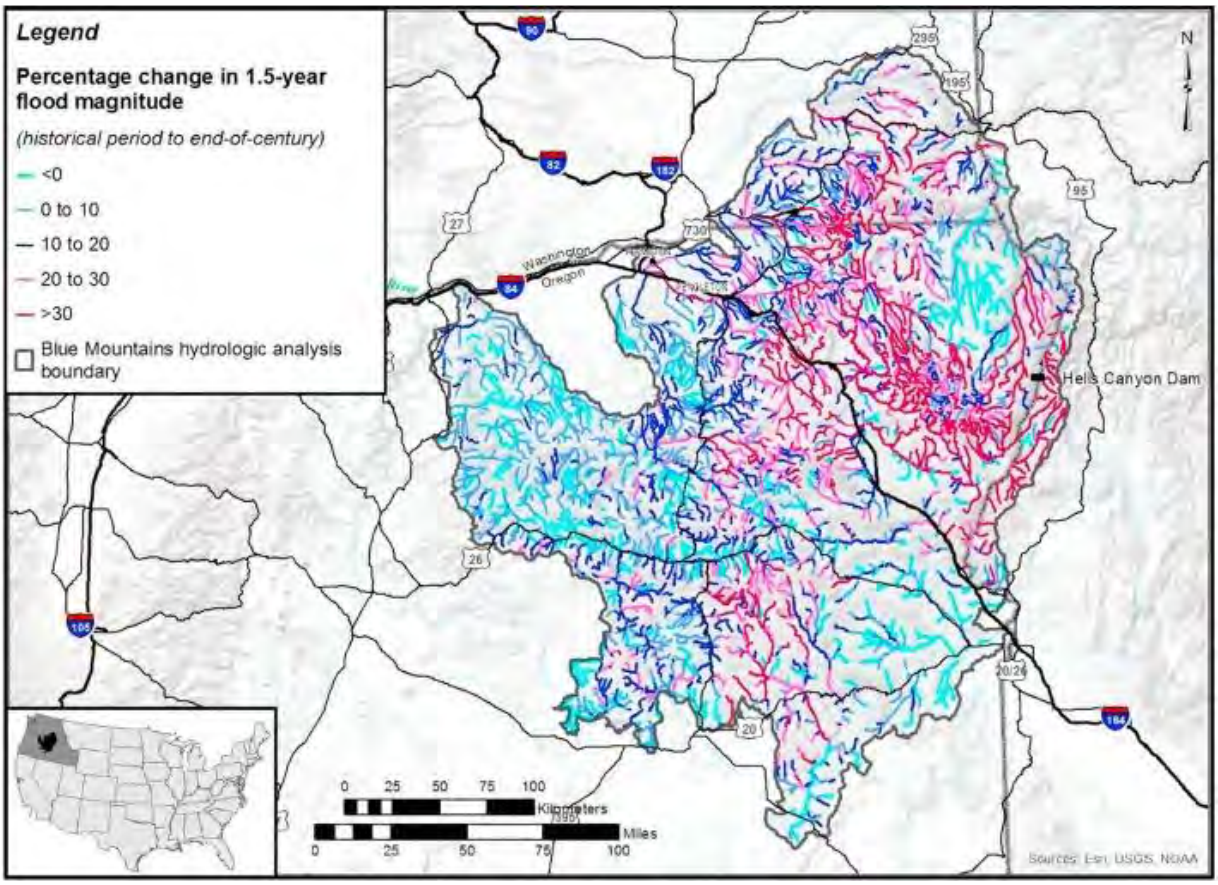

Figure 14 Projected change in the 1.5-year return interval daily flow magnitude between the historical period (1970–1999) and the 2080s (2070–2099) under a medium emissions scenario (SRES-A1B)[7] for the Blue Mountains region. (Source: Clifton et al., 2018)

Some of the Pacific Northwest's largest floods occur when copious warm rainfall from atmospheric rivers combine with a strong snowpack, resulting in rain-on-snow flooding events (Safeeq *et al.*, 2015). [8] The frequency and intensity—amount of transported moisture—of atmospheric river events is projected to increase along the West Coast in response to rising atmospheric temperatures (Kossin *et al.*, 2017). This larger moisture transport of atmospheric rivers would lead to greater likelihoods of flooding along the West Coast (Konrad and Dettinger, 2017).

Future changes in rain-on-snow events as a result of climate warming depend on elevation. At lower elevations, the frequency of rain-on-snow events is projected to decrease due to decreasing snowpack, whereas at high elevations the frequency of rain-on-snow events is projected to

[7] The medium emissions pathway (SRES-A1B) is from an earlier generation of emissions scenarios and it is most similar to RCP 6.0 from Figure 2.
[8] Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)

increase due to the shift from snowy to rainy days (Surfleet and Tullos, 2013; Safeeq *et al.*, 2015; Musselman *et al.*, 2018). How such changes in rain-on-snow frequency would affect high streamflow events is varied. For example, projections for the Santiam River, OR, show an increase in annual peak daily flows with moderate return intervals (<10 years) but a decrease at higher (> 10-year) return intervals (Surfleet and Tullos, 2013).

Key Messages:

⇒ Mid- to low-elevation areas in Umatilla County's Blue Mountains that are near the freezing level in winter, receiving a mix of rain and snow, are projected to experience an increase in winter flood risk due to warmer winter temperatures causing precipitation to fall more as rain and less as snow.

Drought

Across the western US, mountain snowpack is projected to decline leading to reduced summer soil moisture in mountainous environments (Gergel *et al.*, 2017). Climate change is expected to result in lower summer streamflows in historically snow-dominated basins across the Pacific Northwest as snowpack melts off earlier due to warmer temperatures and summer precipitation decreases (Dalton *et al.*, 2017; Mote *et al.*, 2019). See, for example, the decrease in summer flows expected for the Columbia River at McNary (Figure 12) and the Umatilla River at Pendleton (Figure 13) by the 2050s (2040–2069) under both lower and higher emissions scenarios.

This report presents future changes in five variables indicative of drought conditions—low spring snowpack, low summer soil moisture[9], low summer runoff, low summer precipitation, and high summer evaporation—in terms of a change in the frequency of the historical baseline 1-in-5 year event (that is, an event having a 20% chance of occurrence in any given year). The future projections, displayed in the orange and brown bars of Figure 15, are the frequency in the future period of the magnitude of the event that has a 20% frequency in the historical period.

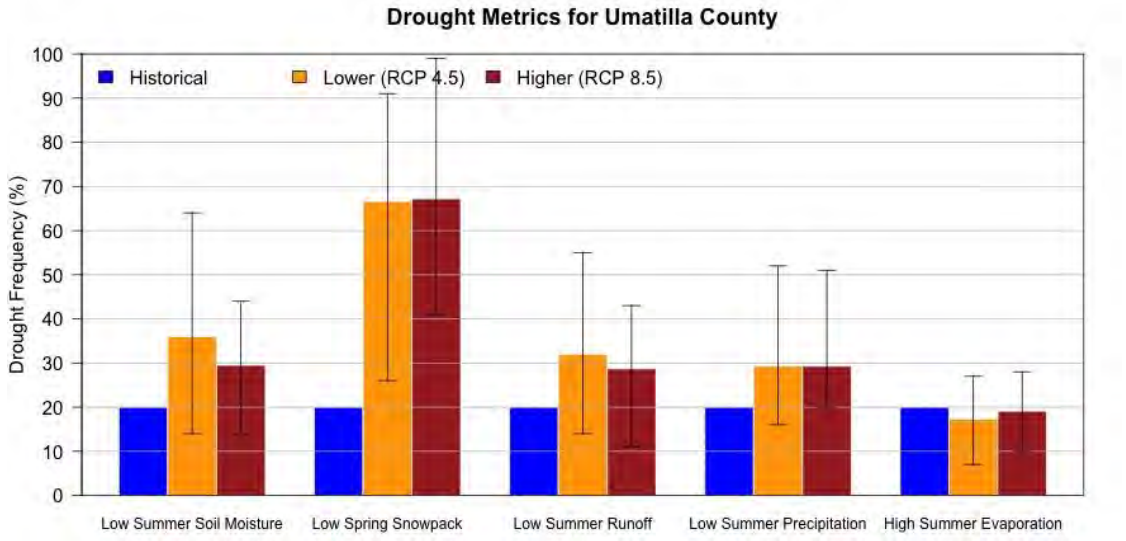

Figure 15 Frequency of the historical baseline (1971–2000) 1-in-5 year event (by definition 20% frequency) of low summer soil moisture (average of June-July-August), low spring snowpack (April 1 snow water equivalent), low summer runoff (total of June-July-August), low summer precipitation (total for June-July-August), high summer evaporation (total for June-July-August) for the future period 2040–2069 for lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios. The bar and whiskers depict the mean and range across ten global climate models. (Data Source: Integrated Scenarios of the Future Northwest Environment, https://climate.northwestknowledge.net/IntegratedScenarios/)

In Umatilla County, spring snowpack (that is, the snow water equivalent on April 1), summer runoff, summer soil moisture, and summer precipitation are projected to decline under both lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios by the 2050s (2040–2069). This leads to the magnitude of low summer soil moisture, low spring snow pack, low summer runoff, and low summer precipitation expected with a 20% chance in any given year of the historical period being projected to occur more frequently by the 2050s under both emissions scenarios (Figure 15). Of the five metrics, climate change shows the strongest impact on spring snowpack in Umatilla County. By the 2050s under the higher emissions scenario, the 1-in-5 year event for

[9] Soil moisture projections are for the total moisture in the soil column from the surface to 140 cm below the surface.

low spring snowpack is projected to become roughly a 1-in-1.5 year event. The projected changes in the 1-in-5 year events for the other variables are smaller and less certain given that some models project an increase and others a decrease. On average, the 1-in-5 year event for low summer precipitation, runoff, and soil moisture is projected to become roughly a 1-in-3.5 year event by the 2050s under the higher emissions scenario. The 2020s (2010–2039) were not evaluated in this drought analysis due to data limitations, but can be expected to be similar but of smaller magnitude to the changes for the 2050s.

Some areas in northeast Oregon are more sensitive to changes in spring snowpack and summer streamflow than others. A climate vulnerability analysis for the Blue Mountains region indicates that declines in spring snowpack are projected to be largest in low to mid-elevation locations, but even some locally higher elevation ranges, such as mid-elevations in the North Fork John Day Wilderness, North Fork Umatilla Wilderness, and Wenaha-Tucannon Wilderness would have relatively high sensitivity to snow losses (Clifton *et al.*, 2018). Summer streamflow in about half of the perennial streams in the Blue Mountains are projected to decrease by less than 10%, while areas more sensitive to changing low flows, such as the Wallowa Mountains, Elkhorn Mountains, and Wenaha-Tucannon Wilderness, are projected to see decreases in summer streamflow of more than 30% by the late 21st century (Clifton *et al.*, 2018) (Figure 16). Sub-basins with high risk for summer water shortage associated with low streamflow include the Upper Grande Ronde, Upper John Day, and Wallowa sub-basins (Figure 17) (Clifton *et al.*, 2018).

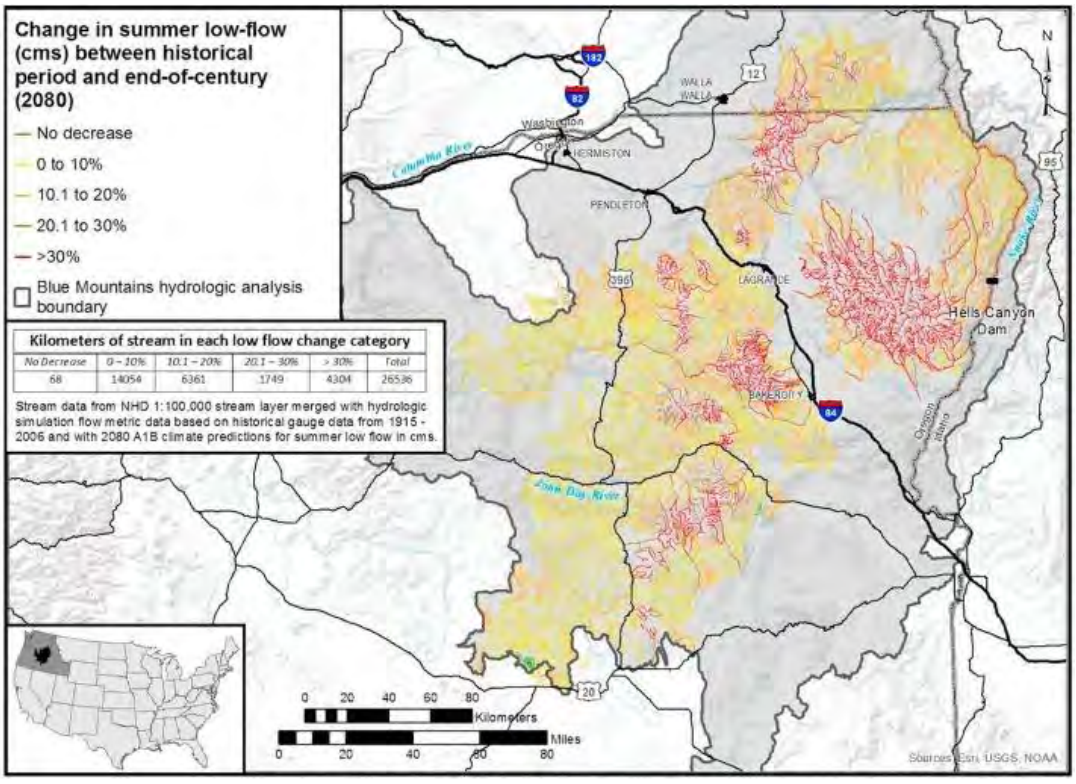

Figure 16 Projected change in mean summer streamflow from the historic time period (1970–1999) to the 2080s (2070–2099) under a medium emissions scenario[10] for streams in the Blue Mountains region. Note, the 0 to 10%, 10.1 to 20%, etc. all indicate decreases in flow. (Source: Clifton et al., 2018)

[10] The medium emissions pathway (SRES-A1B) is from an earlier generation of emissions scenarios and it is most similar to RCP 6.0 from Figure 2.

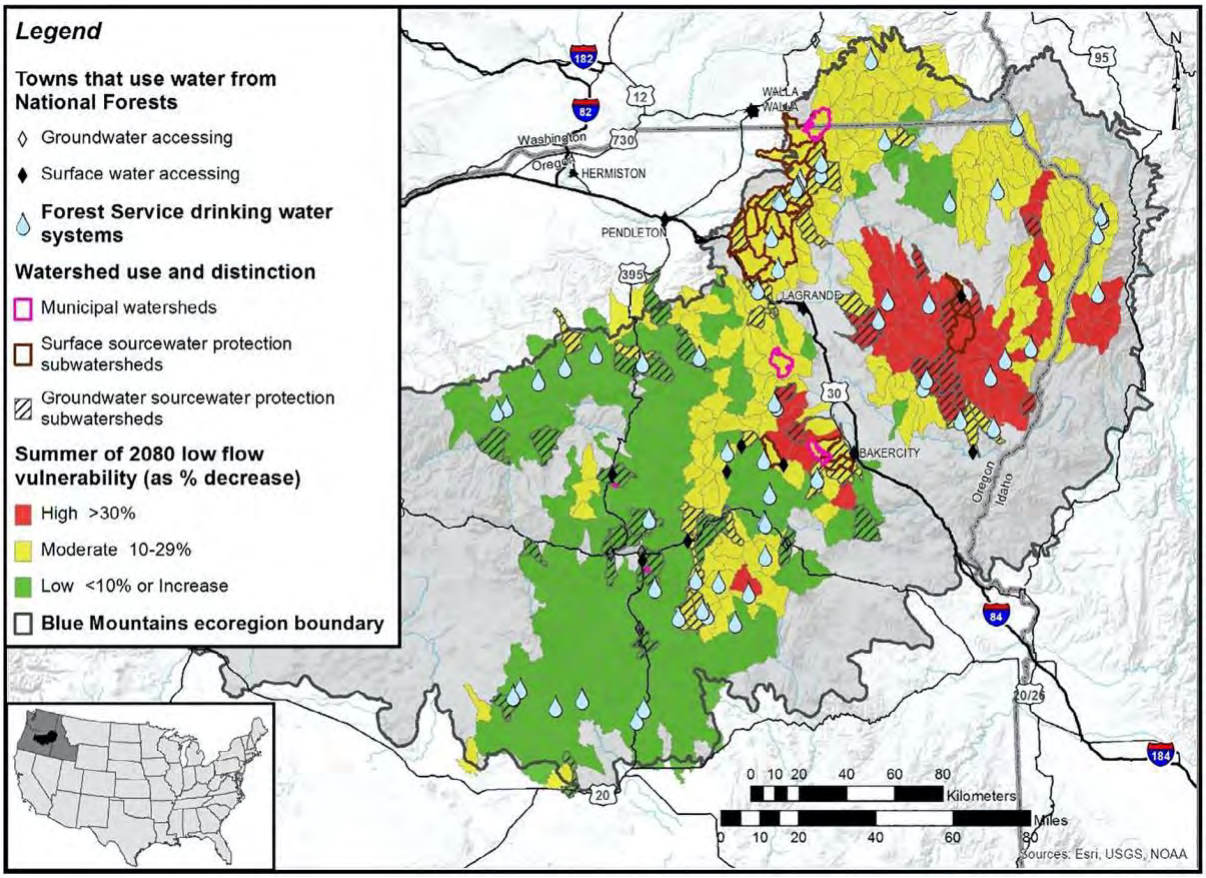

Figure 17 Projected risk of summer water shortage in the Blue Mountains region, based on low streamflows for 2080s (2070–2099) under a medium emissions scenario[11]. (Source: Clifton et al., 2018)

Key Messages:

⇒ Drought conditions, as represented by low summer soil moisture, low spring snowpack, low summer runoff, and low summer precipitation are projected to become more frequent in Umatilla County by the 2050s relative to the historical baseline.

⇒ By the end of the 21st century, summer low flows are projected to decrease in the Blue Mountains region putting some sub-basins at high risk for summer water shortage associated with low streamflow.

[11] The medium emissions pathway (SRES-A1B) is from an earlier generation of emissions scenarios and it is most similar to RCP 6.0 from Figure 2.

Wildfire

Over the last several decades, warmer and drier conditions during the summer months have contributed to an increase in fuel aridity and enabled more frequent large fires, an increase in the total area burned, and a longer fire season across the western United States, particularly in forested ecosystems (Dennison *et al.*, 2014; Jolly *et al.*, 2015; Westerling, 2016; Williams and Abatzoglou, 2016). The lengthening of the fire season is largely due to declining mountain snowpack and earlier spring snowmelt (Westerling, 2016). Recent wildfire activity in forested ecosystems is partially attributed to human-caused climate change: during the period 1984–2015, about half of the observed increase in fuel aridity and 4.2 million hectares (or more than 16,000 square miles) of burned area in the western United States were due to human-caused climate change (Abatzoglou and Williams, 2016).[12]

With climate change, warmer and drier conditions are expected to become more frequent leading to lower fuel moisture and longer fire seasons, which would increase the frequency and area burned of wildfires in the Pacific Northwest (Halofsky *et al.*, 2020). In dry coniferous forests on the east side of the Cascades, there is high likelihood (>66% probability) and high confidence for large increases in wildfire frequency, extent, and severity as well as fire-drought-insect stress interactions by the mid- to late-21st century (Halofsky *et al.*, 2020). Because climate is such a strong driver of factors that lead to total area burned, resource managers are unlikely to have a great influence on total area burned. However, strategic fuel treatments may be able to decrease fire intensity and severity as well as increase forest resilience (Halofsky *et al.*, 2020).

As a proxy for wildfire risk, this report considers a fire danger index called 100-hour fuel moisture (FM100), which is a measure of the amount of moisture in dead vegetation in the 1–3 inch diameter class available to a fire. It is expressed as a percent of the dry weight of that specific fuel. FM100 is a common index used by the Northwest Interagency Coordination Center to predict fire danger. A majority of climate models project that FM100 would decline across Oregon by the 2050s (2040–2069) under the higher (RCP 8.5) emissions scenario (Gergel *et al.*, 2017). This drying of vegetation would lead to greater wildfire risk, especially when coupled with projected decreases in summer soil moisture. This report defines a "very high" fire danger day to be a day in which FM100 is lower (i.e., drier) than the historical baseline 10th percentile value. By definition, the historical baseline has 36.5 very high fire danger days annually. The future change in wildfire risk is expressed as the average annual number of additional "very high" fire danger days for two future periods under two emissions scenarios compared with the historical baseline (Figure 18). The impacts of wildfire on air quality are discussed in the following section on Air Quality.

[12] Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)

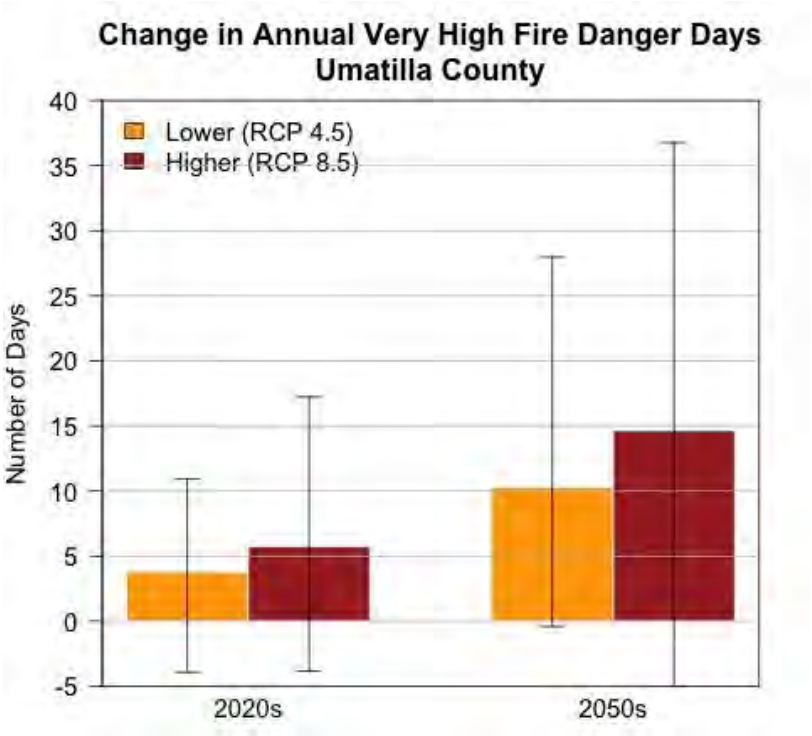

Figure 18 Projected future changes in the frequency of very high fire danger days for Umatilla County from the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 18 global climate models. The bars and whiskers display the mean and range, respectively, of changes across the 18 GCMs. (Data Source: Northwest Climate Toolbox, climatetoolbox.org/tool/Climate-Mapper)

Key Messages:

⇒ Wildfire risk, as expressed through the frequency of very high fire danger days, is projected to increase under future climate change in Umatilla County.

⇒ In Umatilla County, the frequency of very high fire danger days per year is projected to increase on average by about 15 days (with a range of -5 to +37 days) by the 2050s under the higher emissions scenario compared to the historical baseline.

⇒ In Umatilla County, the frequency of very high fire danger days per year is projected to increase on average by about 40% (with a range of -14 to +101%) by the 2050s under the higher emissions scenario compared to the historical baseline.

Air Quality

Climate change is expected to worsen outdoor air quality. Warmer temperatures may increase ground level ozone pollution, more wildfires may increase smoke and particulate matter, and longer, more potent pollen seasons may increase aeroallergens. Such poor air quality is expected to exacerbate allergy and asthma conditions and increase respiratory and cardiovascular illnesses and death (Fann *et al.*, 2016).[13] In addition to increasing health risks, wildfire smoke impairs visibility and disrupts outdoor recreational activities (Nolte *et al.*, 2018). This report presents quantitative projections of future air quality measures related to fine particulate matter (PM2.5) from wildfire smoke.

Climate change is expected to result in a longer wildfire season with more frequent wildfires and greater area burned (Sheehan *et al.*, 2015). Wildfires are primarily responsible for days when air quality standards for PM2.5 are exceeded in western Oregon and parts of eastern Oregon (Liu *et al.*, 2016), although woodstove smoke and diesel emissions are also main contributors (Oregon DEQ, 2016). Across the western United States, PM2.5 levels from wildfires are projected to increase 160% by mid-century under a medium emissions pathway[11] (SRES A1B) (Liu *et al.*, 2016). This translates to a greater risk of wildfire smoke exposure through increasing frequency, length, and intensity of "smoke waves"—that is, two or more consecutive days with high levels of PM2.5 from wildfires (Liu *et al.*, 2016).[14]

The change in risk of poor air quality due to wildfire-specific PM2.5 is expressed as the number of "smoke wave" days within a six-year period and the average intensity—concentration of particulate matter—of smoke wave days in the present (2004–2009) and mid-century (2046–2051) under a medium emissions pathway[15] (Figure 19). See Appendix for description of methodology and access to the Smoke Wave data.

In Umatilla County the frequency of "smoke wave" days is expected to more than double and the intensity—the concentration of particulate matter—of "smoke wave" days is expected to increase.

[13] Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)
[14] Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)
[15] The medium emissions pathway used is from an earlier generation of emissions scenarios. Liu et al. (2016) used SRES-A1B, which is most similar to RCP 6.0 from Figure 2.

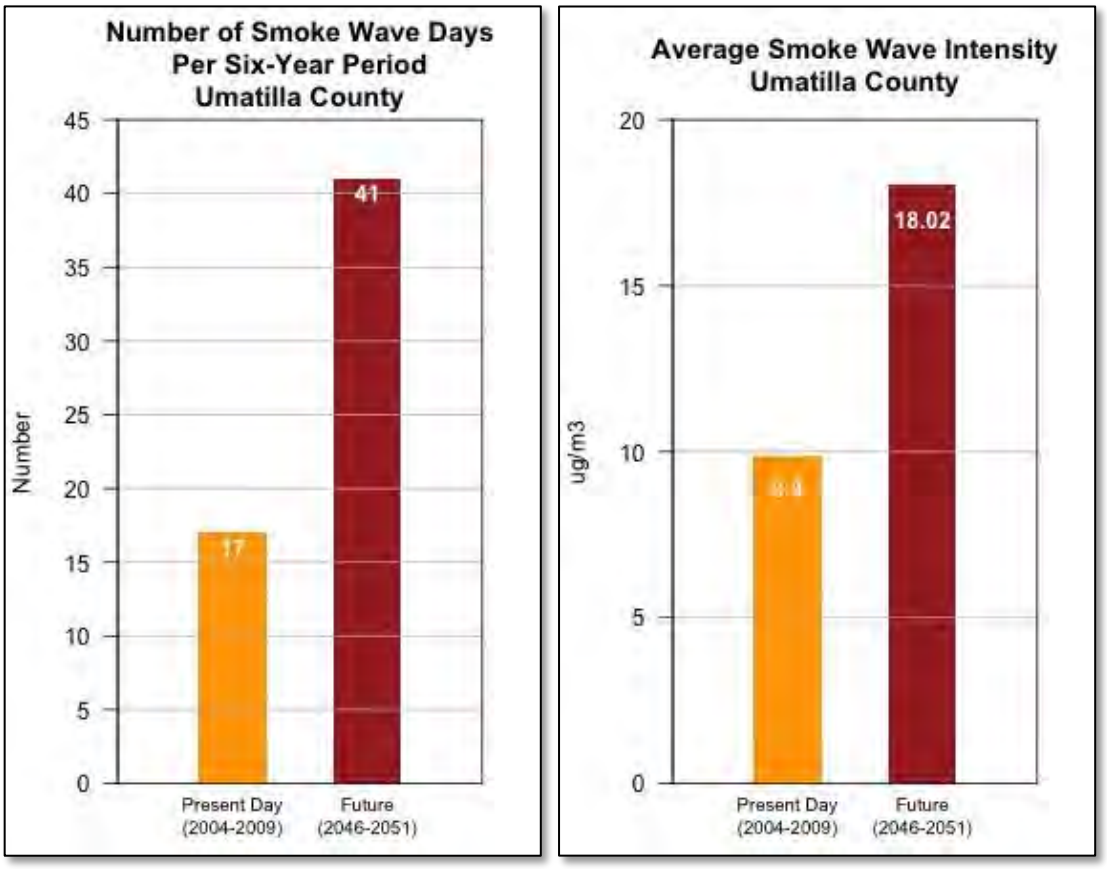

Figure 19 Simulated present day (2004–2009) and future (2046–2051) frequency (left) and intensity (right) of "smoke wave" days for Umatilla County under a medium emissions scenario[11]. The bars display the mean across 15 GCMs. (Data source: Liu et al. 2016, https://khanotations.github.io/smoke-map/)

Key Messages:

⇒ Under future climate change, the risk of wildfire smoke exposure is projected to increase in Umatilla County.

⇒ In Umatilla County, the number of "smoke wave" days is projected to increase by 141% and the intensity of "smoke waves" is projected to increase by 82% by 2046–2051 under a medium emissions scenario compared with 2004–2009.

Windstorms

Climate change has the potential to alter surface winds through changes in the large-scale free atmospheric circulation and storm systems, and through changes in the connection between the free atmosphere and the surface. West of the Cascade Mountains in the Pacific Northwest, changes in surface wind speeds tend to follow changes in upper atmosphere winds associated with extratropical cyclones (Salathé *et al.*, 2015). East of the Cascades, cool air pooling is common which can impede the transport of wind energy from the free atmosphere to the surface. Changes in this factor are likely important for understanding future changes in windstorms (Salathé *et al.*, 2015). However, this is not yet well studied.

Winter extratropical storm frequency in the northeast Pacific exhibited a positive, though statistically not significant, trend since 1950 (Vose *et al.*, 2014). However, there is a high degree of uncertainty in future projections of extratropical cyclone frequency (IPCC, 2013). Future projections indicate a slight northward shift in the jet stream and extratropical cyclone activity, but there is as yet no consensus on whether or not extratropical storms (Vose *et al.*, 2014; Seiler and Zwiers, 2016; Chang, 2018) and associated extreme winds (Kumar *et al.*, 2015) will intensify or become more frequent along the Northwest coast under a warmer climate. Therefore, no descriptions of future changing conditions are included in this report.

Key Messages:

⇒ Limited research suggests very little, if any, change in the frequency and intensity of windstorms in the Pacific Northwest as a result of climate change.

Dust Storms

Climate, through precipitation and winds, and vegetation coverage can influence the frequency and magnitude of dust events, or dust storms, which primarily concern parts of eastern Oregon. Periods of low precipitation can dry out the soils increasing the amount of soil particulate matter available to be entrained in high winds. In addition, the amount of vegetation cover can influence the amount of soil susceptible to high winds.

One study found that in eastern Oregon, precipitation is the dominant factor affecting dust event frequency in the spring whereas vegetation cover is the dominant factor in the summer (Pu and Ginoux, 2017). The same study projected that in the summertime in eastern Oregon, dust event frequency would decrease largely due to a decrease in bareness (or an increase in vegetation cover) (Pu and Ginoux, 2017). There were no clear projected changes in other seasons or locations in Oregon. These projections compare the 2051–2100 average under a higher emissions scenario (RCP 8.5) with the 1861–2005 average.

Another study found that wind erosion in Columbia Plateau agricultural areas is projected to decrease by mid-century under a lower emissions scenario (RCP 4.5) largely due to increases in biomass production, which retain the soil (Sharratt *et al.*, 2015). The increase in vegetation cover in both studies is likely due to the fertilization effect of increased amounts of carbon dioxide in the atmosphere and warmer temperatures. Tillage practices may also influence the amount of soil available to winds. Therefore, no descriptions of future changing conditions are included in this report.

Key Messages:

⇒ Limited research suggests that the risk of dust storms in summer would decrease in eastern Oregon under climate change in areas that experience an increase in vegetation cover from the carbon dioxide fertilization effect.

Increased Invasive Species Risk

Warming temperatures, altered precipitation patterns, and increasing atmospheric carbon dioxide levels increase the risk for invasive species, insect and plant pests for forest and rangeland vegetation, and cropping systems.

Warming and more frequent drought will likely lead to a greater susceptibility among trees to insects and pathogens, a greater risk of exotic species establishment, more frequent and severe forest insect outbreaks (Halofsky and Peterson, 2016), and increased damage by a number of forest pathogens (Vose *et al.*, 2016). In Oregon and Washington, mountain pine beetle (*Dendroctonus ponderosae*) and western spruce budworm (*Choristoneura freemani*) are the most common native forest insect pests, and both have caused substantial tree mortality and defoliation over the past several decades (Meigs *et al.*, 2015).[16]

Climatic warming has facilitated the expansion and survival of mountain pine beetles, particularly in areas that have historically been too cold for the insect (Littell *et al.*, 2013). Across the western United States, the time between generations among different populations of mountain pine beetles is similar; however, the amount of thermal units required to complete a generation cycle was significantly less for beetles at cooler sites (Bentz *et al.*, 2014). Winter survival and faster generation cycles could be favored under future projections of decreases in the number of freeze days (Rawlins *et al.*, 2016).[17] Bark beetle outbreaks can interact with drought stress to influence fire hazard in forests in the years after the outbreak. Within the first four years after an outbreak when trees retain drying needles, "fire hazard has been found to increase as the proportion of the stand killed by bark beetles increases" (Halofsky *et al.*, 2020). About five to ten years after an outbreak when snags remain standing, surface fire potential increases while crown fire potential decreases. However, one to several decades after an outbreak when snags have fallen and understory vegetation grows, fire hazard is generally lower (Halofsky *et al.*, 2020).

Western spruce budworm is a destructive defoliator that sporadically breaks out in interior Oregon Douglas-fir (*Pseudotsuga menziesii*) forests (Flower *et al.*, 2014). An analysis of three hundred years of tree ring data reveals that outbreaks tended to occur near the end of a drought, when trees' physiological thresholds had likely been reached. This analysis suggests that such outbreaks would likely intensify under the more frequent drought conditions that are projected for the future (Flower *et al.*, 2014), unless increasing atmospheric carbon dioxide, which may enhance water use efficiency, mitigates drought stress.[18]

More frequent rangeland droughts could facilitate invasion of non-native weeds as native vegetation succumbs to drought or wildfire cycles, leaving bare ground (Vose *et al.*, 2016). Cheatgrass (*Bromus tectorum L.*), a lower nutritional quality forage grass, facilitates more frequent fires, which reduces the capacity of shrub steppe ecosystem to provide livestock forage and critical wildlife habitat (Boyte *et al.*, 2016). Cheatgrass is a highly invasive species in the rangelands in the West that is projected to expand northward (Creighton *et al.*, 2015) and remain stable or increase in cover in most parts of the Great Basin (Boyte *et al.*, 2016) under climate change.[19]

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[16] Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017), p. 49

[17] Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017), p. 49

[18] Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017), p. 49–50

[19] Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017), p. 70

Crop pests and pathogens may continue to migrate poleward under global warming as has been observed globally for several types since the 1960s (Bebber *et al.*, 2013). Much remains to be learned about which pests and pathogens are most likely to affect certain crops as the climate changes, and about which management strategies will be most effective.[20]

Key Messages:

⇒ Warming temperatures, altered precipitation patterns, and increasing atmospheric carbon dioxide levels increase the risk for invasive species, insect and plant pests for forest and rangeland vegetation, and cropping systems.

[20] Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017), p. 67

Loss of Wetland Ecosystems

Wetlands play key roles in major ecological processes and provide a number of essential ecosystem services: flood reduction, groundwater recharge, pollution control, recreational opportunities, and fish and wildlife habitat, including for endangered species.[21] Climate change stands to affect freshwater wetlands in Oregon through changes in the duration, frequency, and seasonality of precipitation and runoff; decreased groundwater recharge; and higher rates of evapotranspiration (Raymondi *et al.*, 2013).

Reduced snowpack and altered runoff timing may contribute to the drying of many ponds and wetland habitats across the Northwest.[22] The absence of water or declining water levels in permanent or ephemeral wetlands would affect resident and migratory birds, amphibians, and other animals that rely on the wetlands (Dello and Mote, 2010). However, potential future increases in winter precipitation may lead to the expansion of some wetland systems, such as wetland prairies.[23]

In Oregon's western Great Basin, changes in climate would alter the water chemistry of fresh and saline wetlands affecting the migratory water birds that depend on them. Hotter summer temperatures would cause freshwater sites to become more saline making them less useful to raise young birds that haven't yet developed the ability to process salt. At the same time, increased precipitation would cause saline sites to become fresher thereby decreasing the abundance of invertebrate food supply for adult water birds (Dello and Mote, 2010).

Key Messages:

⇒ Freshwater wetland ecosystems are sensitive to warming temperatures and altered hydrological patterns, such as changes in precipitation seasonality and reduction of snowpack.

[21] Verbatim from the Oregon Climate Change Adaptation Framework, p. 62

[22] Verbatim from the Climate Change in the Northwest (Dalton *et al.*, 2013), p. 53

[23] Verbatim from the Climate Change in the Northwest (Dalton *et al.*, 2013), p. 53

Appendix

Future Climate Projections Background

Read more about emissions scenarios, global climate models, and uncertainty in the Climate Science Special Report, Volume 1 of the Fourth National Climate Assessment (https://science2017.globalchange.gov).

Emissions Scenarios: https://science2017.globalchange.gov/chapter/4#section-2

Global Climate Models & Downscaling:
https://science2017.globalchange.gov/chapter/4#section-3

Uncertainty: https://science2017.globalchange.gov/chapter/4#section-4

Climate & Hydrological Data

Statistically downscaled GCM output from the Fifth phase of the Coupled Model Intercomparison Project (CMIP5) served as the basis for future projections of temperature, precipitation, and hydrology variables. The coarse resolution of GCMs output (100–300 km) was downscaled to a resolution of about 6 km using the Multivariate Adaptive Constructed Analogs (MACA) method, which has demonstrated skill in complex topographic terrain (Abatzoglou and Brown, 2012). The MACA approach utilizes a gridded training observation dataset to accomplish the downscaling by applying bias-corrections and spatial pattern matching of observed large-scale to small-scale statistical relationships. (For a detailed description of the MACA method see: https://climate.northwestknowledge.net/MACA/MACAmethod.php.)

This downscaled gridded meteorological data (i.e., MACA data) is used as the climate inputs to an integrated climate-hydrology-vegetation modeling project called Integrated Scenarios of the Future Northwest Environment (https://climate.northwestknowledge.net/IntegratedScenarios/). Snow dynamics were simulated using the Variable Infiltration Capacity hydrological model (VIC version 4.1.2.l; (Liang *et al.*, 1994) and updates) run on a $1/16^{th}$ x $1/16^{th}$ (6 km) grid.

Simulations of historical and future climate for the variables maximum temperature (*tasmax*), minimum temperature (*tasmin*), and precipitation (*pr*) are available at the daily time step from 1950 to 2099 for 20 GCMs and 2 RCPs (i.e., RCP4.5 and RCP8.5). Hydrological simulations of snow water equivalent (*SWE*) are only available for the 10 GCMs used as input to VIC. Table 11 lists all 20 CMIP5 GCMs and indicates the subset of 10 used for hydrological simulations. Data for all the models available was obtained for each variable from the Integrated Scenarios data archives in order to get the best uncertainty estimates.

All simulated climate data and the streamflow data have been bias-corrected using quantile-mapping techniques. Only SWE is presented without bias correction. Quantile mapping adjusts simulated values by creating a one-to-one mapping between the cumulative probability distribution of simulated values and the cumulative probability distribution of observed values. In practice, both the simulated and observed values of a variable (e.g., daily streamflow) over the some historical time period are separately sorted and ranked and the values are assigned their respective probabilities of exceedence. The bias corrected value of a given simulated value is assigned the observed value that has the same probability of exceedence as the simulated value.

Table 11 The 20 CMIP5 GCMs used in this project. The subset of 10 CMIP5 GCMs used in the Integrated Scenarios: Hydrology dataset are noted with asterisks.

Model Name	Modeling Center
BCC-CSM1-1 BCC-CSM1-1-M*	Beijing Climate Center, China Meteorological Administration
BNU-ESM	College of Global Change and Earth System Science, Beijing Normal University, China
CanESM2*	Canadian Centre for Climate Modeling and Analysis
CCSM4*	National Center for Atmospheric Research, USA
CNRM-CM5*	National Centre of Meteorological Research, France
CSIRO-Mk3-6-0*	Commonwealth Scientific and Industrial Research Organization/Queensland Climate Change Centre of Excellence, Australia
GFDL-ESM2G GFDL-ESM2M	NOAA Geophysical Fluid Dynamics Laboratory, USA
HadGEM2-CC* HadGEM2-ES*	Met Office Hadley Center, UK
INMCM4	Institute for Numerical Mathematics, Russia
IPSL-CM5A-LR IPSL-CM5A-MR* IPSL-CM5B-LR	Institut Pierre Simon Laplace, France
MIROC5* MIROC-ESM MIROC-ESM-CHEM	Japan Agency for Marine-Earth Science and Technology, Atmosphere and Ocean Research Institute (The University of Tokyo), and National Institute for Environmental Studies
MRI-CGCM3	Meteorological Research Institute, Japan
NorESM1-M*	Norwegian Climate Center, Norway

The historical bias in the simulations is assumed to stay constant into the future; therefore the same mapping relationship developed from the historical period was applied to the future scenarios. For MACA, a separate quantile mapping relationship was made for each non-overlapping 15-day window in the calendar year. For streamflow, a separate quantile mapping relationship was made for each calendar month.

Hydrology was simulated using the Variable Infiltration Capacity hydrological model (VIC; Liang et al. 1994) run on a $1/16^{th}$ x $1/16^{th}$ (6 km) grid. To generate daily streamflow estimates, runoff from VIC grid cells was then routed to selected locations along the stream network using

a daily-time-step routing model. Where records of naturalized flow were available, the daily streamflow estimates were then bias-corrected so that their statistical distributions matched those of the naturalized streamflows.

The wildfire danger day metric was computed using the same MACA climate variables to compute the 100-hour fuel moisture content according to the equations in the National Fire Danger Rating System.

Smoke Wave Data

Abstract from Liu et al. (2016):
Wildfire can impose a direct impact on human health under climate change. While the potential impacts of climate change on wildfires and resulting air pollution have been studied, it is not known who will be most affected by the growing threat of wildfires. Identifying communities that will be most affected will inform development of fire manage- ment strategies and disaster preparedness programs. We estimate levels of fine particulate matter ($PM_{2.5}$) directly attributable to wildfires in 561 western US counties during fire seasons for the present-day (2004–2009) and future (2046–2051), using a fire prediction model and GEOS-Chem, a 3-D global chemical transport model. Future estimates are obtained under a scenario of moderately increasing greenhouse gases by mid-century. We create a new term "Smoke Wave," defined as ≥2 consecutive days with high wildfire-specific $PM_{2.5}$, to describe episodes of high air pollution from wildfires. We develop an interactive map to demonstrate the counties likely to suffer from future high wildfire pollution events. For 2004–2009, on days exceeding regulatory $PM_{2.5}$ standards, wildfires contributed an average of 71.3 % of total $PM_{2.5}$. Under future climate change, we estimate that more than 82 million individuals will experience a 57 % and 31 % increase in the frequency and intensity, respectively, of Smoke Waves. Northern California, Western Oregon and the Great Plains are likely to suffer the highest exposure to wildfire smoke in the future. Results point to the potential health impacts of increasing wildfire activity on large numbers of people in a warming climate and the need to establish or modify US wildfire management and evacuation programs in high-risk regions. The study also adds to the growing literature arguing that extreme events in a changing climate could have significant consequences for human health.

Data can be accessed here: https://khanotations.github.io/smoke-map/
For the DLCD project, we looked at the variables "Total # of SW days in 6 yrs" and "Average SW Intensity". The first variable tallies all the days within each time period in which the fine particulate matter exceeded the threshold defined as the 98th quantile of the distribution of daily wildfire-specific $PM_{2.5}$ values in the modeled present-day years, on average across the study area. The second variable computes the average concentration of fine particulate matter across identified "smoke wave" days within each time period. Liu et al. (2016) used 15 GCMs from the Third Phase of the Coupled Model Intercomparison Project (CMIP3) under a medium emissions scenario (SRES-A1B). The data site only offers the multi-model mean value (not the range), which should be understood as the aggregate direction of projected change rather than the actual number expected.

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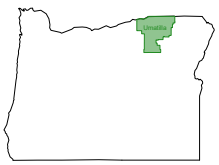
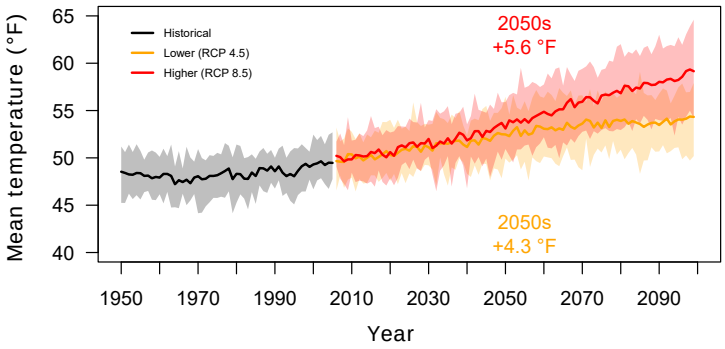


Future Climate Projections for Umatilla County

Climate change is expected to increase the occurrence, magnitude, or frequency of most climate-related natural hazards, such as heat waves, drought, wildfire and poor air quality, heavy rains, and flooding.

The Oregon Climate Change Research Institute projected future changes in climate metrics related to county-level natural hazards on the basis of 10–20 downscaled global climate model simulations. Metrics were calculated for the 2050s (2040–2069 average) relative to the 1971–2000 average under two scenarios of global greenhouse gas emissions.

The higher scenario (RCP 8.5) assumes continued increases in emissions and results in a 5.6°F increase in average annual temperature in Umatilla County by the 2050s. The lower scenario (RCP 4.5) assumes moderate reductions in emissions and results in a 4.3°F increase. This summary describes projected changes in some metrics relevant to natural hazards in the county by the 2050s under RCP 8.5.



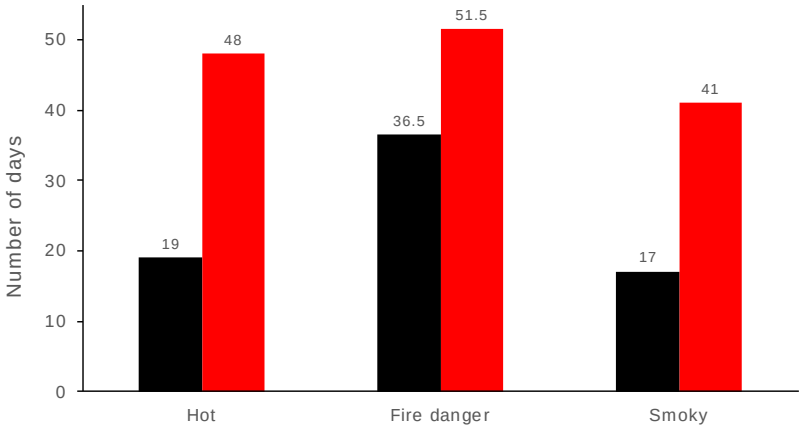
Projected average annual temperature in Umatilla County.

For additional information, see the full report, *Future Climate Projections for Umatilla County, October 2020*, at blogs.oregonstate.edu/occri/projects/dlcd/.

Heat

Wildfire

Poor Air Quality



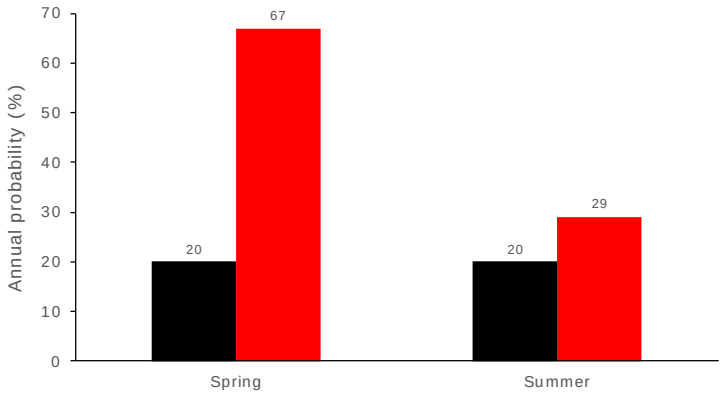
Observed historical (1971–2000, black bars) and projected future (2040–2069, red bars) number of days per year on which maximum temperature exceeds 90°F, fire danger is very high, and are part of a smoke wave.

- More hot days. By the 2050s, Umatilla County is projected to have 29 more days above 90°F, and the temperature on the hottest day of the year will be 9°F greater.
- The number of days with weather that coincides with very high fire danger will increase by 40%.
- The number of days that are part of a smoke wave, defined as two or more consecutive days on which fine particulate matter from wildfires results in unhealthy air, will increase by 141%.

Oregon Climate Change Research Institute OCCRI DLCD Department of Land Conservation and Development

Drought

- Increased probability of drought. By the 2050s, the annual probability of snow drought and summer drought of the magnitude expected with a 20% probability during 1971–2000 will increase to 67% and 29%, respectively.

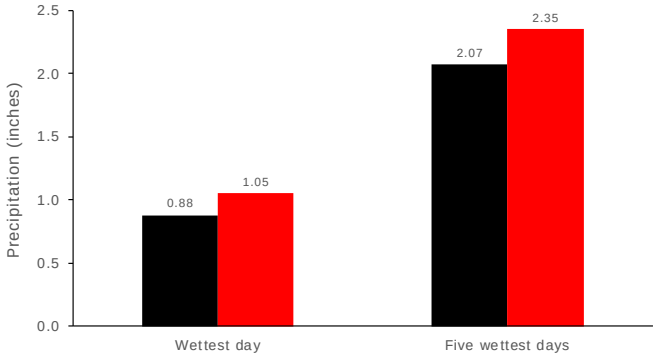


Observed historical (1971–2000, black bars) and projected future (2040–2069, red bars) probability of a spring (1 April) snow drought or summer (June through August) drought.

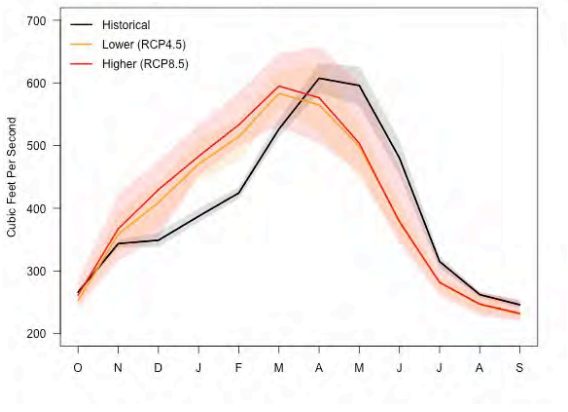
Heavy Rains

Flooding

- More-extreme precipitation. By the 2050s, the amount of precipitation on the wettest day of the year will increase by an average of 19% relative to 1971–2000, and the amount of precipitation on the five wettest days of the year will increase by 14%.
- The risk of winter flooding will increase as the proportion of precipitation falling as rain rather than snow increases, thereby increasing winter streamflows.



Observed historical (black bars) and projected future (red bars) precipitation on the wettest day of the year and cumulative precipitation on the five wettest days of the year.



Monthly streamflow, across the water year (1 October – 30 September), of the Umatilla River at Pendelton from 1971–2000 and projected streamflow from 2040–2069 under two scenarios of greenhouse gas emissions.

APPENDIX F: UMATILLA COUNTY NHMP HAZARDS MAPS DETAILS

Introduction

A large majority of the maps located in Umatilla County's NHMP 2020 update were created by Umatilla County Land Use Planning. There are a total of 30 maps covering natural hazards, utilities, cropland and more. A handful of maps were created through open-source online mapping programs. Many datasets used to create this map were either generated by Umatilla County or were obtained by Umatilla County from other agencies. In several cases, metadata for the dataset or shapefile was not included, or could not be obtained. If metadata was not available there is a statement similar to *"Metadata was not provided"* following the map description.

Some datasets were obtained by Umatilla County many years ago and the county has since lost the institutional knowledge regarding the data source. Every effort was made by Umatilla County to properly source data used. Not all datasets are open-source available, those that are available to the public have links to the appropriate website from which they were retrieved.

More info regarding each map, the data used, metadata (if any) and data sources can be found below. Maps are listed in alphabetical order by map title. Please also see the Hazard Map Spreadsheet, found in Appendix F for a more brief description.

Building Density (Figure B-28)

Building density data was obtained by Umatilla County from Oregon DLCD. The data used included county boundaries from Oregon Spatial Data Library, the PLSS quarter-quarter quad polygons from Bureau of Land Management and building footprint data from Microsoft. Microsoft released the building footprint information as open data in June of 2018.

Building density per PLSS quarter-quarter quadrant was determined by calculating the area of the quarter-quarter quadrant, and dividing said area by the total area of building footprints within each quarter-quarter quadrant. The building footprint area may include partial footprints of buildings that cross quarter-quarter quadrant boundaries.

This dataset is not available for public download.

Cascadia Subduction Zone (CSZ) Magnitude 9 Susceptibility (Figure EQ-6)

The potential Cascadia Subduction Zone Magnitude 9 Earthquake would have a detrimental effect on Oregon. Umatilla County obtained liquefaction susceptibility for the magnitude 9 earthquake from Oregon Department of Geology and Mineral Industries (DOGAMI). The dataset was published in 2013, and obtained by Umatilla County in 2020. Liquefaction susceptibility in Umatilla County ranges from none/very low to high.

From the metadata: *"This map shows liquefaction susceptibility for Oregon calculated following the methods of FEMA's 2011 HAZUS-MH MR4 technical manual. The map was prepared in support of a series of ground motion and ground failure maps for a scenario Magnitude 9.0 Cascadia Subduction Earthquake developed by the Oregon Department of Geology and Mineral Industries. The scenario*

maps were prepared for the Oregon Seismic Safety Policy Advisory Commission for its use in preparing a report to the 77th Oregon Legislative Assembly entitled "The Oregon Resilience Plan; Reducing Risk and Improving Recovery for the Next Cascadia Earthquake and Tsunami".

For this map, the geology was primarily taken from OGDC 5 (Ma and others, 2009, in references) and SLIDO 2 (Burns and others, 2011 in references) with some coming from published liquefaction studies. The methods and data used to make this map are described in detail in: MADIN, I.P., and Burns, W.J., 2013, Ground motion, ground deformation, tsunami inundation, co-seismic subsidence, and damage potential maps for the 2012 Oregon Resilience Plan for Cascadia Subduction Zone Earthquakes; Oregon Department of Geology and Mineral Industries Open-File Report O-13-06."

This dataset is available for download at: https://www.oregongeology.org/gis/index.htm.

Community Wildfire Protection Plan (CWPP) Areas within Umatilla County (Figure WF-13)

The CWPP dataset was obtained from Oregon Department of Forestry (ODF) in 2020. The dataset provides names and boundaries to the Community Wildfire Protection Plan (CWPP) Areas covered by ODF within Umatilla County. Umatilla County contains three CWPP Areas; Blue Mountain Foothills Region CWPP, West County CWPP, and the Mill Creek OR & Walla Walla WA CWPP. Metadata was not provided.

The dataset is available for download at:
https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx.

Critical Groundwater Areas (Figure DR-3)

Umatilla County contains four separate Critical Groundwater Areas (CGWAs). All four are located in West Umatilla County and span within the cities of Umatilla, Hermiston, Echo, and Stanfield. The CGWAs are named: Butter Creek, Ordinance Gravel, Ordinance Basalt, and Stage Gulch.

There are 22 designated groundwater administrative areas in Oregon, with differing levels of restriction. These include CGWAs, groundwater limited/classified areas, and areas withdrawn from further appropriation. Restrictions vary from time-limited permit restrictions for uses requiring water rights, closed to new appropriations, or those that have well construction requirements to protect senior water rights. Oregon Water Resources Department (OWRD) staff monitor these areas to ensure that the restrictions adequately protect the groundwater resource and existing users.[1]

There is the Lower Umatilla Basin Groundwater Management Area, which covers most of the critical ground water areas in Umatilla County.

> "In accordance with Oregon's Groundwater Quality Protection Act of 1989, the Oregon Department of Environmental Quality (DEQ) and the Oregon Department of Agriculture (ODA) declared the Lower Umatilla Basin a Groundwater Management Area (GWMA) in 1990 because regional nitrate-nitrogen concentrations exceeded 7 milligrams per liter (mg/L). This area encompasses Morrow and Umatilla counties including Hermiston, Boardman, Irrigon, Stanfield, and Echo, OR. After the GWMA was declared, a 4-year

[1] Oregon Water Resources Department, *Groundwater*, https://www.oregon.gov/OWRD/programs/GWWL/GW/Pages/AdminAreasAndCriticalGWAreas.aspx

interagency hydrogeological investigation was conducted to determine the extent of contamination and to identify the potential sources of that contamination."[2]

See Figure DR-3 for a map of the CGWAs in Umatilla County.

Information obtained from Oregon Water Resources Department, https://www.oregon.gov/OWRD/programs/GWWL/GW/Pages/AdminAreasAndCriticalGWAreas.aspx

Critical Infrastructure (Figure 2-4)

The critical infrastructure dataset was created by Umatilla County, using the Critical / Essential Facilities, Critical Infrastructure, and Vulnerable Population Centers List aka Critical Infrastructure List created by NHMP Steering Committee members. This point data was designed for the *2021 Umatilla County NHMP*, and is meant to provide a general idea of critical infrastructure locations. There are three shapefiles included, which mirror the categories of assets in the Critical Infrastructure List: Critical Infrastructure, Critical Facilities, and Vulnerable Populations.

Steering Committee members from Umatilla County, each city, and each special district provided locations of the critical infrastructure to County Planning. It is hoped that these shapefiles will continue to be updated and used in future NHMPs and by Umatilla County Emergency Management.

This dataset is not available for public download.

Crop Land Cover (Figure DR-4)

This map was generated by CropScape, a mapping program courtesy of the US Department of Agriculture (USDA). The top 20 land cover categories are shown on the map and listed by decreasing acreage. The map was generated and downloaded in PDF format, the PDF was then edited to display Umatilla County's 12 cities and their locations.

The CropScape platform is available at: https://nassgeodata.gmu.edu/CropScape/.

Earthquake History (Figure EQ-3)

Earthquake history data was obtained from Oregon Department of Geology and Mineral Industries (DOGAMI). The dataset was created by DOGAMI by the request of Umatilla County and includes the location and magnitude of earthquakes on record up to November 2020. Metadata was not provided in the dataset.

This dataset is not available for public download. DOGAMI's website is found at: https://www.oregongeology.org/.

Expected Earthquake Shaking (Figure EQ-5)

This map was created with the intensity raster data file that was provided by Oregon DOGAMI. It was provided at the request of Umatilla County for the purpose of this *2021 Umatilla County NHMP*. The shaking intensity dataset was released to Umatilla County in January 2021.

DOGAMI used the US Geological Survey's ShakeMap USGS Instrumental Intensity Scheme to generate the raster file. Reference for the raster data can be found at: https://usgs.github.io/shakemap/manual4_0/sm4_introduction.html#.

[2] *Lower Umatilla Basin Groundwater Management Area*, https://lubgwma.org/, accessed 3/11/21

This dataset is not available for public download. DOGAMI's website is found at: https://www.oregongeology.org/.

Faults and Fault Lines (Figure EQ-4)

A buried fault is a three-dimensional surface within the planet that might extend up to the surface or might be completely buried. In contrast, a fault line is where the fault cuts the Earth's surface, if it cuts it at all.

From the metadata: *"The area of the Umatilla Basin geologic compilation map lies in northeast Oregon. Map coverage includes the entire Umatilla Basin, and the Willow Creek Basin within Morrow County. The map covers most of Morrow and Umatilla Counties, and small parts of Union and Wallowa Counties. The Umatilla Basin in NE Oregon consists of two distinct geographic provinces. Relatively flat lowlands at elevations of 200 m along the Columbia River are flanked to the south and east by the Blue Mountains which rise to elevations of 1500 m. The lowlands are intensely farmed, and the mountain areas are largely public and private forestland.*

The bedrock geology of the area is dominated by lava flows of the middle to late Miocene Columbia River Basalt Group, which blanket most of the area to depths of over 1000 m. Windows of older rocks along the crest of the Blue Mountains and in deep canyons expose Paleozoic to Mesozoic intrusive and metamorphic rocks, Paleocene continental sedimentary rocks and Eocene to Oligocene volcanic and volcanoclastic rocks. Quaternary sand and gravel deposits, chiefly outburst flood sediments from the late Pleistocene Missoula Floods and Pleistocene loess cover much of the lowlands. The dominant structure in the area is the Blue Mountains Anticline, which arcs roughly ENE across the southern edge of the map area. Significant faulting occurs along the Blue Mountain front east of Pendleton." Metadata provided by Oregon DOGAMI.

This dataset is available for download at: https://www.oregongeology.org/gis/index.htm.

Fire Protection Districts (Figure WF-12)

The fire protection districts data set was created and is maintained by Umatilla County. The map was created as a guide to members of the public and public officials to identify which district a property is protected under, if any. In Umatilla County's Smoke Management Chapter (Chapter 95 of Umatilla County Code of Ordinances), Fire Districts are defined as: "Any fire protection district that is funded by taxes paid by those who reside within boundaries established and recorded by Umatilla County" http://www.co.umatilla.or.us/bcc/codes/95.pdf.

This dataset is not available for public download.

Floodplain Maps (1-7) (Figures FL-4-FL-10)

Areas within a FEMA designated floodplain are found throughout Umatilla County. Because of this, the Floodplain Maps are broken down into one vicinity map (Map 1) and six localized maps: West County (Map 2), Central County (Map 3), East County (Map 4), Ukiah (Map 5), Milton Freewater (Map 6), and Mill Creek (Map 7).

The floodplain dataset was provided by FEMA, as FEMA provides flood mapping information, designation and regulation for the entire country. FEMA's flood mapping provides which areas are designated as Special Flood Hazard Areas (SFHA). The Special Flood Hazard Areas located in Umatilla County are: A, AE, AO and Floodway. FEMA has strict regulations for new construction in each SFHA, if construction is able to be permitted.

Umatilla County has experienced several large flooding events in recent years. After February 2020's flooding event, two residential structures were reported to FEMA as having repetitive loss due to flooding. One was a single-family home in Weston and the other was a residential condominium located on the Umatilla Reservation.

Umatilla County's floodplain maps were last updated in 2010. Recent flooding events have sparked the desire among Umatilla County's residents for re-mapping to occur along portions of the Umatilla River.

FEMA's Flood Map Service Center is available at: https://msc.fema.gov/portal/home.

Landslide Inventory (Figure LS-3)

Umatilla County obtained the Landslide Inventory dataset from Oregon DOGAMI in 2020. Data was released as SLIDO 3.0 in 2014.

Description of Deposits Shapefile (as shown in the map legend):

Debris Flow Fan - Debris flows are rapidly moving, extremely destructive landslides.

Landslide Deposits – Main body of the landslide.

Talus-Colluvium – Talus and Colluvium are two types of landslide related deposits.

From the metadata: "*This database is an inventory of existing landslides. The landslide inventory is one of the essential data layers used to delineate regional landslide susceptibility. It is possible that landslides within the mapped area were not identified or occurred after the data was prepared.*

This data was prepared by following the Protocol for Inventory Mapping of Landslide Deposits from Light Detection and Ranging (Lidar) Imagery developed by Burns and Madin (DOGAMI Special Paper 42, 2009). The three primary tasks include compilation of previously mapped landslides, lidar-based morphologic mapping of landslide features, and review of aerial photographs. Landslides identified by these methods are digitally compiled into this database at varying scales. The recommended map/use scale for these data is 1:8,000. Each landslide is also attributed with classifications for activity, depth of failure, movement type, and confidence of interpretation.

The landslide inventory is intended to provide users with basic information regarding landslides. The geologic, terrain, and climatic conditions that led to landslides in the past may provide clues to the locations and conditions of future landslides, and it is intended that this data will provide useful information to develop regional landslide susceptibility maps, to guide site-specific investigations for future developments, and to assist in regional planning and mitigation of existing landslides." Metadata provided by Oregon DOGAMI.

This dataset is available for download at: https://www.oregongeology.org/gis/index.htm.

Debris Flow definition sited from: https://www.oregongeology.org/Landslide/debrisflow.htm#:~:text=Debris%20flows%20are%20rapidly%20moving,hillsides%20and%20through%20narrow%20canyons.

Other definitions were also obtained from the SLIDO 3.0 Report.

Landslide Susceptibility (Figure LS-4)

Umatilla County obtained the Landslide Inventory dataset from Oregon DOGAMI in 2020. Data was released as LS-SUS-4, last updated in 2016. DOGAMI provided classifications for landslide

susceptibility as low, moderate, high and very high. Descriptions for each classification are provided below, retrieved from Oregon DOGAMI Open-File Report, O-16-02.

"Low is described as landsliding unlikely, and areas classified as Landslide Density = Low (less than 7%) and areas classified as Slopes Prone to Landsliding = Low.

Moderate is described as landsliding possible, areas classified as Landslide Density = Low to Moderate (less than 17%) and areas classified as Slopes Prone to Landsliding = Moderate OR areas classified as Landslide Density = Moderate (7%-17%) and areas classified as Slopes Prone to Landsliding = Low.

High is described as landsliding likely, areas classified as Landslide Density = High (greater than 17%) and areas classified as Slopes Prone to Landsliding = Low and Moderate OR areas classified as Landslide Density = Low and Moderate (less than 17%) and areas classified as Slopes Prone to Landsliding = High.

Very high is described as existing landslides, Landslide Density and Slopes Prone to Landsliding data w ere not considered in this category. Note: the quality of landslide inventory (existing landslides) mapping varies across the state."

This dataset is available for download at: https://www.oregongeology.org/gis/index.htm.

The Susceptibility Overview Map of Oregon contains more information and can be found at: https://www.oregongeology.org/pubs/ofr/O-16-02_plate1_lowRes.pdf.

ODOT Bridge Conditions (Figure B-26)

Oregon Department of Transportation (ODOT) provides an interactive mapping program, TransGIS, which provides updated information on structures (such as bridges), highways, traffic data and more. Bridge information is available for ODOT managed bridges, such as locations and their status (structurally deficient, closures, etc.). This map shows ODOT bridges within Umatilla County, identifying those classified as structurally deficient.

Structurally Deficient is defined as: "*A bridge condition rating used by the Federal Highway Administration to indicate deteriorated physical conditions of the bridge's structural elements (primarily deck, superstructure, and substructure) and reduced load capacity. Some of these bridges are posted and may require trucks of a certain weight to detour. A classification of "structurally deficient" does not imply that bridges are unsafe. When an inspection reveals a safety problem, the bridge is posted for reduced loads, scheduled for repairs, or in unusual situations, closed until repairs can be completed. Structural deficiency is one of the many factors that are used in the ODOT State Bridge Program for project ranking or selection.*"

The ODOT Bridge Conditions dataset was obtained from ODOT in January 2021, the dataset was last updated on September 9, 2020.

The dataset is available for download via ODOT's TransGIS mapping tool at: ftp://ftp.odot.state.or.us/tdb/trandata/GIS_data/Bridge/.

The Structurally Deficient definition was obtained from ODOT's 2020 Bridge Condition Report and Tunnel Data, page 7, the report is available at: https://www.oregon.gov/odot/Bridge/Documents/Final_2020BridgeConditionReport.pdf.

Population Density (Figure B-27)

Population density data was provided by the US Census Bureau. The dataset was created from the population census data gathered in 2010 and is broken down by census block.

This dataset is available for download at: https://www2.census.gov/census_2010/04-Summary_File_1/Oregon/.

Utility Service Areas (Figure B-25)

The various datasets used to create this map reference the main electric utility providers that serve Umatilla County: Pacific Power, Hermiston Energy, and Umatilla Electric Cooperative. There are some service areas that overlap. Areas not covered by a provider in this map may be served by another electric provider that is not identified on this map, and are not necessarily without electric services.

Pacific Power metadata: *"Data Set includes facilities within requested boundary as of 04/2016. Data is provided for requestor use only (see "Use Limitations" below) and should not be distributed without written approval from PacifiCorp. PacifiCorp makes every effort to ensure the accuracy of the information shown, however it makes no warranty or representation, expressed or implied, as to the use, accuracy, or interpretation of the data, and is not responsible for any inaccuracies herein contained. The data are provided for informational purposes only. Please note that mapping data provided by PacifiCorp is in no way to be considered the equivalent of, or a substitute for, utility location services such as the nationwide call-before-you-dig 811 hotline* http://call811.com/contact-us.aspx*."* Data provided by PacifiCorp, 2016.

Hermiston Energy metadata: *"This data was derived from the Hermiston city limits and legacy data from CanMap."* Data provided by Umatilla Electric Cooperative, 2015.

Umatilla Electric metadata: *"This data was derived from the Hermiston city limits and legacy data from CanMap."* Data provided by Umatilla Electric Cooperative, 2015.

Milton Freewater Power & Light: Data provided by the City of Milton Freewater, 2021.

These datasets are not available for public download.

Vicinity Map (Figure EX-1)

Umatilla County is located in Northeastern Oregon and is bordered by the Columbia River to the north, Union and Wallowa Counties to the east, Grant County to the south, and Morrow County to the west.

The Oregon County dataset is available for download at: https://spatialdata.oregonexplorer.info/geoportal/details;id=361c06fee9de4e24a72e280fb386a771.

Wildfire Burn Probability (Figure WF-15)

The Burn Probability dataset was obtained by Umatilla County from the US Forest Service in 2020, and the data reflects information retrieved from 1984 to 2017. The burn probability classifications were set by the US Forest Service and are as follows: no data, low, low, moderate, moderate, high, high and very high. Some levels are duplicated, however, each classification captures different probability levels. For example, *Moderate (1 in 5,000 to 1-1,000) and Moderate (1 in 1,000 to 1 in 100)*. These burn probability classifications are clearly denoted on the map.

From the metadata: *"The purpose of the USFS Pacific Northwest Region Wildfire Risk Assessment (PNRA) is to provide foundational information about wildfire hazard and risk to highly valued resources and assets across the Region. Such information supports regional fuel management planning decisions, as well as revisions to land and resource management plans. A wildfire risk assessment is a quantitative analysis of assets and resources and how they would be potentially impacted by wildfire. The PNRA analysis considers several different components, each resolved spatially across the region, including: • likelihood of a fire burning, • the intensity of a fire if one should occur, • the exposure of assets and resources based on their locations, and • the susceptibility of those assets and resources to wildfire FSim – Large-wildfire simulation system FSim is a comprehensive fire occurrence, growth, behavior, and suppression simulation system that uses locally relevant fuel, weather, topography, and historical fire occurrence information to generate spatially resolved estimates of the contemporary likelihood and intensity of wildfire events (Finney and others 2011). FSim generates stochastic simulation data based on many thousands of iterations, then integrates those iterations into a probabilistic result. An FSim iteration spans one entire year."* Metadata provided by the US Forest Service.

This dataset is available for download at:
https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx.

Wildfire History (Figure WF-14)

ODF Fire Locations: Displays fire locations of fires managed by ODF from 1992-2019. Data obtained by Umatilla County from Oregon Department of Forestry (ODF) in 2020. From ODF metadata: *"2016 to 2019 fire points from Oregon Department of Forestry (ODF), Northwest Interagency Coordination Center (NWCC), Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), National Park Service (NPS), United States Forest Service (USFS), and United States Geological Survey (USGS). Combined by Oregon Department of Forestry. Data from 2015 and earlier are from: Short, Karen C. 2017. Spatial wildfire occurrence data for the United States, 1992-2015 [FPA_FOD_20170508]. 4th Edition. Fort Collins, CO: Forest Service Research Data Archive.* https://doi.org/10.2737/RDS-2013-0009.4"

This dataset is available for download at:
https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx

Local Fire Locations: Displays fire location of fires managed by local fire districts from 2003 to August 2020. Data was obtained by Umatilla County from the Oregon State Fire Marshal (OSFM) in February 2021. Data was provided in excel spreadsheet format with longitude and latitude coordinates, date, responsible agency, incident number, aid and more. Metadata was not available. The data provided in the spreadsheet was then imported to a shapefile by Umatilla County using ArcGIS Pro.

The following table was included by OSFM:

Wildland Fires (NFIRS Incident Type Code - 141) 2003 - Present

Agency	Wildland Fires	Total Acres Burned
East Umatilla County RFPD #7-412	5	-
East Umatilla F&R	5	2.01
Echo RFPD	1	-
Milton-Freewater Emergency Medical Services	9	4
Milton-Freewater FD	2	-
Pendleton Fire and Ambulance	12	10.1

Pilot Rock RFPD	2	15
Stanfield Fire District	2	-
Umatilla County Fire District 1	9	0.16
Umatilla RFPD #7-405	2	1
Grand Total	**49**	**32.27**

This data file is not available for public download and was provided by the Office of the Oregon State Fire Marshal. Oregon State Fire Marshal's website: https://www.oregon.gov/osp/programs/sfm/Pages/default.aspx.

Overall Wildfire Risk (Figure WF-18)

Wildfire Risk data file was obtained and retrieved by Umatilla County from US Forest Service Pacific Northwest Region in 2020. The overall wildfire risk layer classifications were set by the US Forest Service and include the following risk levels: very high, high, moderate, low, low benefit and benefit. From the metadata: *"The wildfire risk assessment is a quantitative analysis of assets and resources and how they would be potentially impacted by a wildfire. The PRNA analysis considers several different components, each resolved spatially across the region, including: likelihood of a fire burning, the intensity of a fire if one should occur, the exposure of assets and resources based on their locations, and the susceptibility of those assets and resources to a wildfire."* Metadata provided by US Forest Service Pacific Northwest Region.

Note for all Wildfire Risk Maps: The Wildfire Risk data file contains several layers showing wildfire risk for separate groups: overall risk, risk to assets, and risk to property and people. Because each group's risk was analyzed in the same manner, the metadata for each wildfire risk map remains the same even though different information is displayed.

The dataset used for the Wildfire Risk Maps is available for download at: https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx.

Wildfire Risk to Assets (Figure WF-17)

The Wildfire Risk to Assets layer is a subset of the Wildfire Risk Data file obtained from the US Forest Service Pacific Northwest Region in 2020. The Wildfire Risk to Assets layer classifications were set by the US Forest Service and include the following risk levels: low, moderate, high and very high. The main assets identified to having high/very high wildfire risk appear to be main transportation routes.

From the metadata: *"The wildfire risk assessment is a quantitative analysis of assets and resources and how they would be potentially impacted by a wildfire. The PRNA analysis considers several different components, each resolved spatially across the region, including: likelihood of a fire burning, the intensity of a fire if one should occur, the exposure of assets and resources based on their locations, and the susceptibility of those assets and resources to a wildfire."* Metadata provided by US Forest Service Pacific Northwest Region.

Wildfire Risk to Property and People (Figure WF-16)

The Wildfire Risk to Property and People layer is a subset of the Wildfire Risk Data file obtained from the US Forest Service Pacific Northwest Region in 2020. The Risk Value was set by the US Forest Service and ranges from "low" to "high".

From the metadata*: "The wildfire risk assessment is a quantitative analysis of assets and resources and how they would be potentially impacted by a wildfire. The PRNA analysis considers several*

different components, each resolved spatially across the region, including: likelihood of a fire burning, the intensity of a fire if one should occur, the exposure of assets and resources based on their locations, and the susceptibility of those assets and resources to a wildfire." Metadata provided by US Forest Service Pacific Northwest Region.

Wildfire Smoke Sensitivity (Figure WF-19)

Smoke Sensitive Receptor Areas (SSRA) are designated for the highest level of protection under the smoke management plan, as described and listed in OAR 629-048-0140. As put in simple terms by an Oregon Department of Forestry staff member, Sensitive Smoke Receptor Areas (SSRA) relate to areas that are to be protected from smoke. The only location in Umatilla County that meets this is in Pendleton. Dataset retrieved from Oregon Department of Forestry in 2020.

This dataset is available for download at:
https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx.

Wildfire Weather Zones (Figure WF-20)

Historic Burn Areas and Fire Weather Zones are defined by Oregon Department of Forestry. Taken from ODF's website: "Fire Weather Zones were identified by extending lines from other themes that define geographic and cultural boundaries. Historic Burn Areas are areas that ODF has identified as having been affected by previous large fires." Data from 1984-2017, retrieved by Umatilla County in 2020 from ODF.

This dataset and more information are available at:
https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx.

Table F-1 Umatilla County Natural Hazards Mitigation Plan Mapping Metadata

Umatilla County Natural Hazards Mitigation Plan Mapping Metadata					
Figure #	**Map Title**	**Layer (if applicable)**	**Description**	**Data Source**	**Website**
B-28	Building Density	Building Density	Density displayed by PLSS quarter-quarter quadrant	Oregon DLCD	DLCD's Website: https://www.oregon.gov/lcd/Pages/index.aspx
EQ-6	Cascadia (CSZ) Magnitude 9 Susceptibility	Liquefaction Susceptibility	Liquefaction is when saturated sand and silt take on the characteristics of a liquid during an earthquake. This dataset looks at the liquefaction susceptibility of if a magnitude 9 earthquake were to occur along the Cascadia Subduction Zone.	Oregon DOGAMI	Dataset available for download at: https://www.oregongeology.org/gis/index.htm
WF-13	Community Wildfire Protection Plan (CWPP) Areas	Community Wildfire Protection Plan Areas	Provides names and boundaries to the Community Wildfire Protection Plan Areas covered by ODF within Umatilla County.	Oregon Department of Forestry	Dataset available for download at: https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx

			Metadata was not provided.		
DR-3	Critical Groundwater Areas	Butter Creek CGWA, Ordinance Gravel CGWA, Ordinance Basalt CGWA, Stage Gulch CGWA and Lower Umatilla Basin Ground Water Management Area	Critical Groundwater Areas (CGWA) are designated and managed by Oregon Water Resources Department.	Umatilla County Planning Department	Oregon Water Resources Department's Website: https://www.oregon.gov/OWRD/programs/GWWL/GW/Pages/AdminAreasAndCriticalGWAreas.aspx
2-4	Critical Infrastructure	Critical Facilities, Critical Infrastructure and Vulnerable Population Centers	These layer files were created from the Critical/Essential Facilities, Critical Infrastructure, Vulnerable Population Centers List (aka Critical Infrastructure List) that was created by NHMP Steering Committee members.	Umatilla County Planning Department / NHMP Steering Committee	NHMP's Webpage: http://umatillacounty.net/nhmp/

DR-4	Crop Land Cover	Land Cover Categories	Map was generated by CropScape, courtesy of the USDA. The top land cover categories are shown on the map by decreasing acreage.	US Department of Agriculture (USDA)	The CropScape platform is available at: https://nassgeodata.gmu.edu/CropScape/
EQ-3	Earthquake History	Earthquake Epicenter and Magnitude	Refers to the location and magnitude of earthquakes in DOGAMI's record up to November 2020.	Oregon DOGAMI	DOGAMI's Website: https://www.oregongeology.org/
EQ-5	Expected Earthquake Shaking	Shaking Intensity	Displays expected shaking intensity during an earthquake. The dataset uses the US Geological Survey's ShakeMap USGS Instrumental Intensity Scheme for reference.	Oregon DOGAMI, US Geological Survey (USGS)	DOGAMI's Website: https://www.oregongeology.org/
EQ-4	Fault Lines	Buried Faults, Fault Lines	A buried fault is a three-dimensional surface within the planet that might extend up to the surface or might be completely buried. In contrast, a fault line is where the fault cuts the Earth's surface, if it cuts it at all.	Oregon DOGAMI, Open-File Report O-07-15	Dataset available for download at: https://www.oregongeology.org/gis/index.htm

WF-12	Fire Protection Districts	Fire District Layers	Displays fire protection district boundaries for use by the public and public officials	Umatilla County Planning Department	Map available on Planning's Webpage at: http://www.co.umatilla.or.us/planning/GIS%20maps/UmatillaCountyFireDistricts.pdf
Figures FL-4 to FL-10	Floodplain Maps (1-7)	Flood Hazard Zones	The Floodplain Hazard Maps are broken down into one vicinity map (Map 1) and six localized maps; West County, Central County, Ukiah, East County, Milton Freewater and Mill Creek. Umatilla County's Floodplain maps were last updated in 2010.	FEMA	FEMA's Flood Map Service Center: https://msc.fema.gov/portal/home
LS-3	Landslide Inventory	Deposits	This database is an inventory of existing landslides. The landslide inventory is one of the essential data layers used to delineate regional landslide susceptibility.	Oregon DOGAMI	Dataset available for download at: https://www.oregongeology.org/gis/index.htm
LS-4	Landslide Susceptibility	Statewide Landslide Susceptibility	DOGAMI provided classifications for landslide susceptibility as low, moderate, high	Oregon DOGAMI	Dataset available for download at: https://www.oregongeology.org/gis/index.htm

		Overview Map	and very high. Values were not provided to coincide with the classifications. Metadata was not provided.		Also see the Susceptibility Overview Map of Oregon, found at: https://www.oregongeology.org/pubs/ofr/O-16-02_plate1_lowRes.pdf
B-26	ODOT Bridge Conditions	ODOT Bridge Conditions	Provides visual information for ODOT managed bridges in Umatilla County, and their current state; if the bridge is structurally deficient or not	Oregon Department of Transportation (ODOT)	Dataset available for download at: ftp://ftp.odot.state.or.us/tdb/trandata/GIS_data/Bridge/
B-27	Population Density	Population by Census Tract (2010)	The dataset was created from the population census data gathered in 2010 and is broken down by census block.	Data.Census.Gov	Dataset available for download at: https://www2.census.gov/census_2010/04-Summary_File_1/Oregon/
B-25	Utility Service Areas	Pacific Power, Hermiston Energy, Umatilla Electric and UEC & Pacific Power Overlap,	The various datasets reference the main electric utility providers that serve Umatilla County; Pacific Power, Hermiston Energy and Umatilla Electric Cooperative. There are	PacifiCorp, Umatilla Electric Cooperative and Milton Freewater Light and Power	PacifiCorp's Website: https://www.pacificorp.com/ Umatilla Electric Cooperative's Website: https://www.umatillaelectric.com/

		Milton Freewater Light & Power	some areas that overlap. Areas not covered by a provider in this map may be served by another electric provider and are not necessarily without electric services.		Milton Freewater Light and Power's Website: https://www.mfcity.com/electric
EX-1	Vicinity Map	Umatilla County	Umatilla County is located in North-Eastern Oregon and is bordered by the Columbia River (followed by the State of Washington) to the north, Union and Wallowa Counties to the east, Grant County to the south, and Morrow County to the west.	Oregon County dataset provided by the Bureau of Land Management (BLM).	Dataset available for download at: https://spatialdata.oregonexplorer.info/geoportal/details;id=361c06fee9de4e24a72e280fb386a771

WF-15	Wildfire Burn Probability	Burn Probability	The burn probability classifications were set by the US Forest Service and are as follows: no data, low, low, moderate, moderate, high, high and very high. Some levels are duplicated, however, each classification captures different probability levels. For example, Moderate (1 in 5,000 to 1-1,000) and Moderate (1 in 1,000 to 1 in 100).	US Forest Service Pacific Northwest Region	Dataset available for download at: https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx
WF-14	Wildfire History	ODF Fire Locations	Displays fire locations for fires managed by ODF from 1992-2019	Oregon Department of Forestry	Dataset available for download at: https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx
		Local Fire Locations	Displays fire locations for fires managed by local fire districts for the years 2003 - August 2020	Oregon State Fire Marshal	Oregon State Fire Marshal's Website: https://www.oregon.gov/osp/programs/sfm/Pages/default.aspx

WF-18	Overall Wildfire Risk	Overall Wildfire Risk	The overall wildfire risk layer classifications were set by the US Forest Service and include the following risk levels: very high, high, moderate, low, low benefit and benefit.	US Forest Service Pacific Northwest Region	Dataset available for download at: https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx
WF-17	Wildfire Risk to Assets	Wildfire Risk to Assets	The Wildfire Risk to Assets layer classifications were set by the US Forest Service and include the following risk levels: low, moderate, high and very high.	US Forest Service Pacific Northwest Region	Dataset available for download at: https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx
WF-16	Wildfire Risk to Property and People	Wildfire Risk to Property and People	The Risk Value was calculated by the US Forest Service and ranges from “low” to “very high”. The metadata does not provide information as to the value of each classification.	US Forest Service Pacific Northwest Region	Dataset available for download at: https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx

WF-19	Wildfire Smoke Sensitivity	Smoke Sensitive Receptor Areas	Smoke Sensitive Receptor Areas (SSRA) are designated for the highest level of protection under the smoke management plan, as described and listed in OAR 629-048-0140. This means no smoke from prescribed fires or any industrial burning.	Oregon Department of Forestry	Dataset available for download at: https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx
WF-20	Wildfire Weather Zones	Fire Weather Zones, Historic Burn Areas	Fire weather zones were identified by extending lines from other themes that define geographic and cultural boundaries. Historic Burn Areas and Fire Weather Zones are defined by Oregon Department of Forestry	Oregon Department of Forestry	Dataset available for download at: https://www.oregon.gov/odf/aboutodf/Pages/mapsdata.aspx

APPENDIX G:
UMATILLA COUNTY SUCCESS STORIES

Introduction

There are many times when a community ascertains a problem or an issue and then works to troubleshoot or problem solve. That takes recognition and commitment.

One illustration of this commitment to increase resilience is that mitigation actions identified in the NHMPs can become integrated into the regular activities that a community does. For example, these activities may be something like a yearly trimming of roadside vegetation to reduce fuel load for wildfires or a public outreach campaign each winter to alert and remind people of winter hazards. In the mitigation actions tables, communities often mark these activities or actions as “on-going.” These on-going activities have become well accepted activities the community continues to prioritize each year. This is a very good accomplishment to have mitigation integrated as a priority.

Mitigation actions can also be achieved through specific projects.

Below, there are examples from the Umatilla County NHMP Steering Committee of success stories.

AlertSense at Umatilla County

This description of the successful implementation of a mitigation action from the Umatilla County NHMP is provided by Bob Waldher, Umatilla County Planning Director, via personal communication, 3/2/21.

Umatilla County successfully implemented a mitigation action (Short-term, Multi-Hazard #2) from the *2014 Umatilla County NHMP*. The mitigation action was to "develop and implement a public awareness campaign regarding natural hazards and natural hazards safety and tools to achieve disaster resistance." One of these tools for awareness of natural hazards and safety is called "AlertSense" which can be used by Umatilla County to send emergency alerts to Umatilla County residents. By subscribing to AlertSense, residents can choose how they would like to receive emergency alerts. Options include alerts via text message, email, pager, or voicemail (in extreme cases).

The system is intended to be used for emergency alerts, as well as non-emergency incidents that may have significant impacts to residents. It is especially effective because many households no longer utilize traditional landline telephones. Emergency Alerts could be related to specific hazards that require some kind of action be taken such as evacuation, shelter in place, boil water orders, etc. Non-emergency alerts could include significant transportation problems with prolonged impacts or significant ongoing police or fire activity. In addition to receiving information on a wireless device, subscribers may also receive notification on landline telephone, depending on the type of incident or event.

The County can tailor the alerts to go to a certain geographic area, or to all subscribers of the program. A recent example of when AlertSense was utilized was during the 2020 flood events. Subscribers received alerts about weather warnings, evacuation information, and other important emergency-related messages. The AlertSense program has been a tremendous tool to improve public communication during natural hazards and other emergency events.

Umatilla County 2020 Flood Response and Debris Management

This success story, including the photos, was provided by Gina Miller, Umatilla County Smoke Management, via personal communication, 3/10/21.

In the early days of February 2020, a series of atmospheric anomalies carrying torrential rains merged with a significant mountain snowpack of 15-30+ inches and coalesced into a massive flood event for Umatilla County. Called by many a "100 year" flood event, the immense amount of damage led the Oregon Governor's office to declare a state of emergency for 3 northeastern Oregon counties while local, state and federal agencies responded to desperate citizens in affected areas with emergency rescues, evacuations, and temporary shelter.

In the days following the onset of the flooding, Umatilla County joined forces with the Umatilla County Solid Waste Advisory Committee and local waste haulers to assist citizens with digging out from the massive amounts of mud, debris and waste generated from the flood. Umatilla County, in partnership with Pendleton Sanitary Service, Humbert's Refuse & Recycle, and Hermiston's Sanitary Disposal, was able to lend a hand with clean up by providing large dumpsters throughout the most distressed areas. Large dumpsters were strategically placed in the worst hit areas and were emptied as needed by the waste haulers. In Pendleton's Riverside area alone, Pendleton Sanitary Service hauled out 800 tons!

Thanks to some innovative forethought and proactive planning, Umatilla County, the County Solid Waste Advisory Committee and local waste haulers were able to provide our citizens with much needed relief. That's what you call a success story!

Source: Gina Miller, Umatilla County, personal communication, 3/10/21

Source: Gina Miller, Umatilla County, personal communication, 3/10/21

APPENDIX H: UMATILLA COUNTY NATURAL HAZARDS OUTREACH CALENDAR

Introduction

This calendar will be used each year to focus on outreach and education efforts on natural hazards on a month by month basis. It relates to **short-term multi-hazard mitigation action #2 (MH#2)** in the *2021 Umatilla County NHMP*.

Media tools to use for outreach: newspapers, websites, Facebook, Twitter, Instagram, utility bill inserts, newsletters, flyers and other materials.

The outreach will be accomplished as a collaboration of partners, with lead contacts and subject matter experts that can provide updated and informative materials. A list of partners will be established for outreach efforts for each of the hazards.

It is recommended that the outreach efforts be tracked and reported on at each Umatilla County NHMP maintenance meeting. The conveners or lead contacts for the *2021 Umatilla County NHMP* are Umatilla County staff: Bob Waldher, Planning Director, and Tom Roberts, Emergency Manager.

Table H-1 Umatilla County Natural Hazards Outreach Calendar

MONTH	NATURAL HAZARD	LEAD CONTACTS
January	Severe winter storms, floods, landslides, volcanoes, earthquakes, air quality	Umatilla County Emergency Manager and Planning Director
February	Severe winter storms, floods, landslides, volcanoes, earthquakes, air quality	Umatilla County Emergency Manager and Planning Director
March	Severe winter storms, floods, landslides, volcanoes earthquakes, air quality, wildfire	Umatilla County Emergency Manager and Planning Director
April	Severe winter storms, floods, landslides, volcanoes, earthquakes, drought, wildfire, air quality,	Umatilla County Emergency Manager and Planning Director
May	Floods, volcanoes, drought, wildfire, air quality	Umatilla County Emergency Manager and Planning Director
June	Severe summer storms, volcanoes, drought, wildfire, air quality	Umatilla County Emergency Manager and Planning Director

July	Severe summer storms, volcanoes, drought, wildfire, air quality	Umatilla County Emergency Manager and Planning Director
August	Severe summer storms, volcanoes, drought, wildfire, air quality	Umatilla County Emergency Manager and Planning Director
September	Severe summer storms, volcanoes, drought, wildfire, air quality	Umatilla County Emergency Manager and Planning Director
October	Volcanoes, drought, wildfire, air quality	Umatilla County Emergency Manager and Planning Director
November	Severe winter storms, floods, landslides, volcanoes, earthquakes, air quality	Umatilla County Emergency Manager and Planning Director
December	Severe winter storms, floods, landslides, volcanoes, earthquakes, air quality	Umatilla County Emergency Manager and Planning Director

Source: DLCD Natural Hazards Planner, Tricia Sears, and the Umatilla County NHMP Steering Committee, 202-2021.

In the table below, the hazards, risk scores, and risk level are listed in order (high to low) as ascertained by the Steering Committee during the *2021 Umatilla County NHMP* update.

Table H-2 Natural Hazards, Risk Scores, and Risk Levels for Umatilla County (same as Table 2-5 in the Risk Assessment)

HAZARD	RISK SCORE	RISK LEVEL (H-M-L)
Floods	240	High
Air Quality	224	High
Severe Summer Storm	223	High
Severe Winter Storm	220	High
Wildfire	203	High
Drought	184	Medium
Earthquakes	151	Medium
Volcano	127	Medium
Landslides/Debris Flows	85	Low

Source: DLCD Natural Hazards Planner, Tricia Sears, and the Umatilla County NHMP Steering Committee, 2020-2021.

In the table below, the natural hazards identified in the *2021 Umatilla County NHMP* are listed with the partner organizations at the local, state, and federal level related to those natural hazards.

Table H-3 Umatilla County Natural Hazards Outreach Calendar Partners

NATURAL HAZARD	PARTNERS
Floods	Cities, NWS/NOAA, FEMA, ODOT, DLCD, OEM, DOGAMI, USACE, Silver Jackets, DSL, CTUIR, Clearview Disability Resource Center, Umatilla County Soil and Water Conservation District, Walla Walla River Irrigation District, Stanfield Irrigation District, Hermiston Irrigation District, Milton-Freewater Water Control District, Walla Walla Basin Watershed Council
Air Quality	Cities, NWS/NOAA, FEMA, DEQ, OEM, CTUIR, Clearview Disability Resource Center
Severe Summer Storm	Cities, NWS/NOAA, FEMA, ODOT, OEM, utilities, CTUIR, Clearview Disability Resource Center
Severe Winter Storm	Cities, NWS/NOAA, FEMA, ODOT, OEM, utilities, CTUIR, Clearview Disability Resource Center
Wildfire	Cities, NWS/NOAA, FEMA, USFS, ODOT, DLCD, ODF, OEM, fire districts, utilities, CTUIR, Clearview Disability Resource Center
Drought	Cities, NWS/NOAA, FEMA, OEM, OWRD, CTUIR, Clearview Disability Resource Center, Walla Walla River Irrigation District, Stanfield Irrigation District, Hermiston Irrigation District, Milton-Freewater Water Control District, Walla Walla Basin Watershed Council
Earthquakes	Cities, NWS/NOAA, FEMA, USGS, OEM, DOGAMI, CTUIR, Clearview Disability Resource Center
Volcano	Cities, NWS/NOAA, FEMA, USGS, CVO, OEM, DOGAMI, CTUIR, Clearview Disability Resource Center
Landslides/Debris Flows	Cities, NWS/NOAA, FEMA, ODOT, DLCD, OEM, DOGAMI, CTUIR, Clearview Disability Resource Center

Source: DLCD Natural Hazards Planner, Tricia Sears, and the Umatilla County NHMP Steering Committee, 2020-2021.

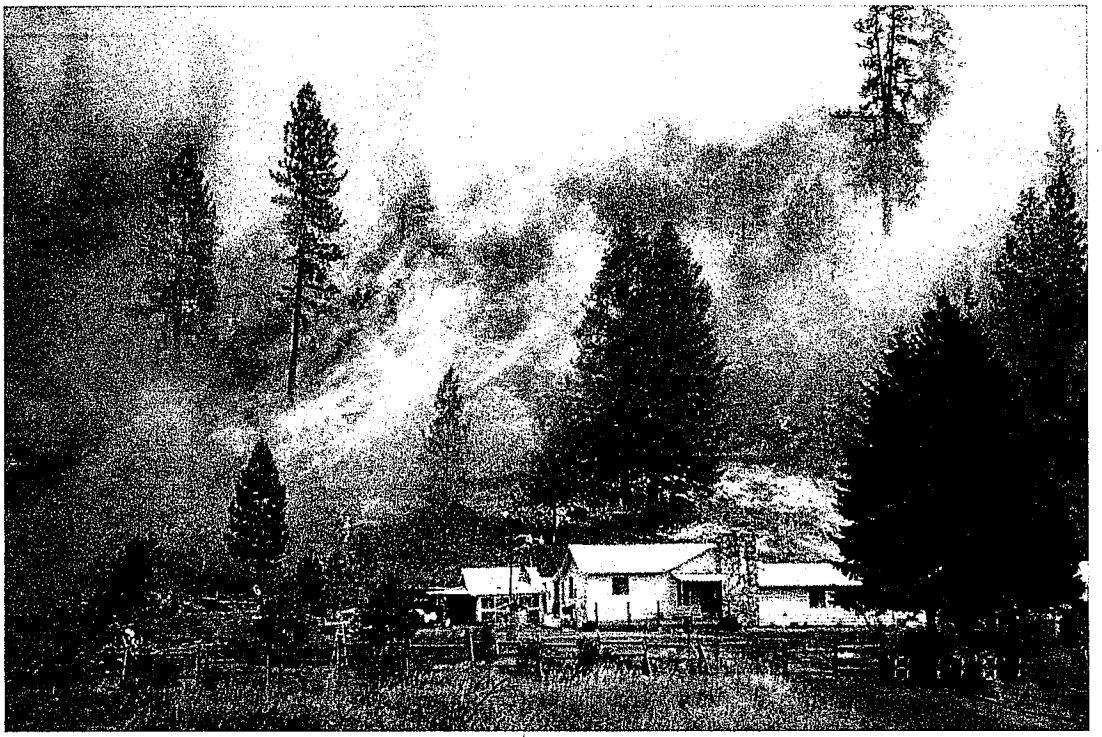
APPENDIX I: UMATILLA COUNTY COMMUNITY WILDFIRE PROTECTION PLANS

Introduction

To reduce the impact of wildfire, Umatilla County has three Community Wildfire Protection Plans (CWPP): the *West County CWPP* (2006), the *Blue Mountains and Foothills Region CWPP* (2005), and the *Mill Creek and Walla Walla County CWPP* (2017).

The CWPPs provide detailed information on the vulnerability and history of wildfire in the County, and provide mitigation actions the County can implement to reduce the impact of wildfire. This *2021 Umatilla County NHMP* links to the CWPPs as it also contains wildfire information and mitigation actions. See Table 3-1, Umatilla County NHMP Mitigation Actions.

The CWPPs can be accessed on the Umatilla County website: http://www.co.umatilla.or.us/planning/Planning_Documentss.html. Note that the *Mill Creek and Walla Wally County CWPP* on the Umatilla County website is from 2009 while the more current *2017 Mill Creek and Walla Walla County CWPP* is on this website: Microsoft Word - Walla Walla County CWPP FINAL.docx (walla-walla.wa.us)



Bridge Creek Fire, August 2001 - near Hwy 395

Umatilla County

Community Wildfire Protection Plan

(Blue Mountains and Foothills Region)

This is a working document that will serve as a resource for enhancing community safety through hazard and risk reduction in the wildland-urban interface areas of Umatilla County.

06/16/05

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TABLE OF CONTENTS

1. Signature Page

The contents of this document have been agreed upon and endorsed by the Umatilla County Commissioners, the District Forester of the Northeast Oregon District for Oregon Department of Forestry, and the County's structural fire representative. This plan is not legally binding in that it does not create or place mandates or requirements on individual jurisdictions. It is intended to serve as a planning tool for the fire and land managers of Umatilla County, and to provide a framework for those local agencies associated with wildfire suppression and protection services to assess the risks and hazards associated with wildland-urban interface areas and to identify strategies for reducing those risks. This is a working document to be reviewed at least annually by members of the Steering Committee and updated as necessary, as outlined in the Monitoring and Evaluation section. The contents, vision, mission, goals, and objectives of this plan will become a part of any operation plan of the agencies represented below:

William S. Hansell — 6/16/05

Bill Hansell, Umatilla County Commissioner — Date

Emile M. Holeman — 6-16-05

Emile Holeman, Umatilla County Commissioner — Date

Dennis J. Doherty — 6-16-05

Dennis Doherty, Umatilla County Commissioner — Date

John Buckman — 6-16-05

John Buckman, Northeast Oregon District Forester — Date
Oregon Department of Forestry

James K. Stearns — 6-16-05

Jim Stearns, Umatilla/Morrow/Gilliam County Fire Defense Chief — Date

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2. Executive Summary

In response to state and federal legislation, the private sector and community organizations across Oregon have worked collaboratively with local, state, and federal wildland fire protection agencies to reduce the impact of wildfire on lives, property, and the landscape. Local communities now have a unique opportunity to influence where and how federal agencies implement fuel reduction projects on federal lands, and how federal funds may be distributed on non-federal lands. The Umatilla County Commissioners tasked a committee of local, state, and federal wildfire agencies, land managers, and private citizens with creating a Community Wildfire Protection Plan (CWPP) for the wildland-urban interface (WUI) areas in Umatilla County. The urban-interface area is the zone where structures and other human development meet and interact with undeveloped wildland or other vegetative fuels.

The committee chose to focus resources on the forested areas of the county since that landscape more nearly meets the criteria for wildland-urban interface. The project area for the CWPP encompasses the eastern and southern portions of Umatilla County (the Blue Mountains and foothills region). The remainder of Umatilla County will need to be covered under another planning document.

Goals of the CWPP include:

- ✓ promote wildfire awareness and target fire prevention and safety information across at-risk communities
- ✓ promote cooperative emergency fire response, identify available resources and needs, and review interagency communication and suppression strategies
- ✓ identify, assess, and reduce hazardous fuels, coordinate risk reduction strategies, and prioritize fuel reduction areas and projects
- ✓ complete annual monitoring and evaluation to assess progress and effectiveness and recommend changes as appropriate

Those communities and WUI areas most at-risk from a wildfire event were identified and prioritized based on public input, local area knowledge of the committee, and an assessment of hazard factors using federal and non-federal data. Information from this hazard assessment was used to develop a scoring matrix. The committee designated and prioritized thirteen WUI areas within Umatilla County:

<u>High Priority</u>
I-84 Corridor
Battle Mountain
Lehman / Hidaway
Weston Mountain / Umatilla River
Mill Creek / Government Mountain

Moderate Priority	Low Priority
Upper 204 / Tollgate	Walla Walla River
Pine Grove	
Camas	
Ukiah	
Birch	
Pearson Guard Station	
McKay	

Specific action items for education, treatment, and emergency response activities were developed for each WUI. Common themes often presented themselves. These repeated themes include presenting FireWise workshops to at-risk communities, general forest health and management activities (such as mechanical thinning and prescribed burning), and treatment strategies along roadways to control noxious weeds and thick, flashy brush. With the continually increasing influx of year-round and seasonal residences, creating and maintaining defensible space around structures remains a top priority for agencies. Wildland fire protection agencies continue to provide updated information to both landowners and tourists on Public Use Restrictions including safe debris burning and campfire restrictions.

The Umatilla County CWPP is a working document that will serve as an informational resource for landowners, agencies, and other stakeholders. It will become a part of the Umatilla County Natural Hazard Mitigation Plan as the wildland fire section of that plan. While some strategies and activities could be individually accomplished by landowners, the CWPP is not intended to mandate treatment activities. It is provided only as a resource and guidance document.

3. Introduction

Background of Wildfire Planning Efforts[1]

Wildland fires are a common and widespread natural hazard in Oregon; the state has a long and extensive history of wildfire. Oregon has over 41 million acres (more than 64,000 square miles) of forest and rangeland that are susceptible to wildfire. Significant portions of Oregon's wildlands and areas adjacent to rural communities, especially in central and eastern Oregon, are dominated by ecosystems that are fire dependent. Agricultural areas in northeastern Oregon grow crops such as wheat that are especially prone to wildfire damage. Many landowners are also converting large acreages over to the Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP), administered by the Farm Service Agency. These lands, especially once in these programs for several years, seem to have a high vulnerability to wildfire events. Communities are also at risk. In the *2001 Federal Register*, there were 367 communities in Oregon identified as being at risk of damage from wildfire.

Over the last few decades, wildland fires in Oregon and across the western United States have increased public awareness to the potential losses of life, property, and natural and cultural resources. The 1995 Oregon Legislature directed the Oregon Department of Forestry (ODF) to "specifically examine the wildland/urban interface situation." To meet this directive, ODF formed the Wildland/Urban Interface Technical Working Group, and in 1997, the Legislature passed the Oregon Forestland Urban-Interface Fire Protection Act, which recognized that the scope of the wildland/urban interface fire problem was beyond what the suppression forces could handle. The key problem was too much fuel around homes in the form of vegetation, as well as the homes themselves. Research showed that the homes were burning because they supplied fuel for the wildfires, but if that fuel load was reduced on and around the home, then the chances of survival increased dramatically. Lawmakers felt that fuel modification on residential property could only be done by the homeowners, and ODF was tasked with implementing the Act.

> ***Wildland-Urban Interface (WUI)***
> This is the area or zone where structures and other human development meet or intermingle with wildland or vegetative fuels.

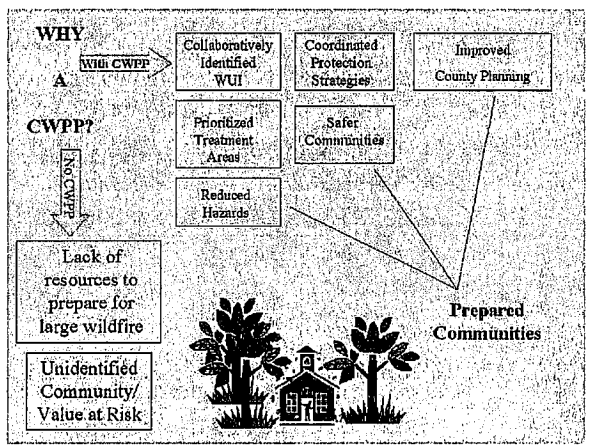
Wildfires exact enormous financial and social costs, from the escalating costs of fighting larger and more complex wildfires, to the loss of homes and lives. There are both short and long-term economic and environmental consequences of large-scale fires. Reducing the impact on lives, property, and the landscape can be realized through preparedness and risk reduction efforts, including a coordinated planning effort for fire protection and implementing activities among local, state, and federal agencies, the private sector, and community organizations. Individual property owners have a major role to play in this coordinated effort, especially in the wildland-urban interface areas.

Over the last three years, ODF has obtained grant dollars to assist Umatilla County private landowners in fuels reduction projects. Grant sources have included National Fire Plan (NFP), the Department of Interior, the Department of Agriculture, Oregon Watershed Enhancement Board, Title III Secure Rural Schools, and Bureau of Indian Affairs. These grant monies have been combined with ODF and participating landowner matching/cost-share dollars to finance these treatment projects. Statewide, ODF units have taken the lead in the development of strategic community wildfire protection plans for implementation of the NFP and Healthy Forests Restoration Act (HFRA) on lands adjacent to or near federal ownership. With funding obtained from a Umatilla County grant, ODF initiated the formation of a steering committee in May 2004, to develop the Umatilla County Community Wildfire Protection Plan (CWPP). The planning process will help identify, prioritize and implement fuels reduction projects, fire prevention education, and other fire-related programs, and support ongoing coordination among fire agencies. By working together to create a local CWPP, Umatilla County, through its association with state and federal forest managers, will continue to stay competitive for federal funding programs such as HFRA, NFP, and Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation Program.

Preparing a Community Wildfire Protection Plan[2]

Both the *National Fire Plan* (NFP) and the *Ten-Year Comprehensive Strategy for Reducing Wildland Fire Risks to Communities* have placed a priority on a collaborative and local involvement in the effort to reduce the risk from large-scale wildfire events. The incentive for communities to engage in comprehensive forest planning and prioritization was given new momentum with the enactment of the Healthy Forest Restoration Act (HFRA) in 2003. The language in HFRA allows flexibility for communities to determine the substance and detail of their plans and the procedures they use to develop them. HFRA emphasizes the need for federal agencies to work collaboratively with communities in developing hazardous fuels reduction projects and places a priority on those treatment areas identified in the local fire plan document.

The participation of local government in the development and implementation of a community wildfire protection plan is also supported by FEMA direction to prepare county hazard mitigation plans and the implementation of Oregon SB 360.



Slide by Angie Johnson, ODF

Fire Policies and Local Planning[3]

Extensive efforts have been undertaken at local, state, and federal levels related to land use planning, community fire planning, and fire protection. This section describes these various efforts as well as related county, state, and federal programs and policies.

Healthy Forests Restoration Act (HFRA)

The Healthy Forest Initiative (HFI), announced in 2002, was designed to identify and remove barriers for implementing restoration projects across national forests. HFI gave federal land managers the authority to treat land as Categorical Exclusions (CE) allowing agencies to move through the NEPA process more quickly, when conditions were appropriate (without an Environmental Assessment (EA) or Environmental Impact Statement (EIS) being required for actions taken on public lands). Review processes were streamlined and new regulations were created under the Endangered Species Act for National Fire Plan projects, to streamline consultation with federal regulatory agencies. HFI set the stage for discussion between Congress and the administration, resulting in new legislation addressing forest health issues.

The Healthy Forest Restoration Act (HFRA) was enacted by Congress in November 2003, providing new tools and additional authorities for treating more acres more quickly in order to meet restoration goals. It provides for new authority to treat fuels on federal land that require NEPA at the EA or EIS level. HFRA strengthens public participation by providing incentives for the local communities to develop their own community wildfire protection plans. It limits the complexities of Environmental Analyses for hazard reduction projects. It provides a more effective appeal process and instructs the Courts to balance short-term affects of implementing projects against the harm caused by delay and long-term benefits of a restored forest.

HFRA Title I addresses vegetation treatments on National Forest System and Bureau of Land Management lands that are at risk of wildland fire or insect and disease epidemics (emphasis is on Fire Regime I, II, and III in Condition Class 2 & 3). Title II encourages each community to develop their own CWPP and to designate their own specific WUIs where restoration projects might occur. Half of all fuel reduction projects under the HFRA must occur in the community protection zone as defined by HFRA. It also encourages biomass energy production through grants and assistance to local communities to help create market incentives for the removal of otherwise valueless forest material.

National Fire Plan (NFP)

Following the explosive fire season of 2000, the National Fire Plan was established to respond to severe wildland fires and their impacts to communities. It is an umbrella term that covers a variety of government programs and ideas addressing wildland fire issues. The NFP is a long-term investment that will help protect human lives, communities, and natural resources, while fostering cooperation and communication among federal, state, and local governments, tribes, and interested publics. Federal

fire agencies worked closely with these partners, and the Western Governor's Association completed a 10-Year Comprehensive Strategy in August 2001. An Implementation Plan was developed in May 2002 to provide consistent and standard direction for implementing the NFP and the Strategy.

The NFP is focused on firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability. The guiding principle for dealing with fire risks is the reduction of hazardous fuel loads threatening communities and wildland ecosystems. Most NFP funding in Oregon goes to wildfire preparedness and hazardous fuel treatment projects.

Federal Emergency Management Agency (FEMA)

Federal Emergency Management Agency (FEMA) has requirements under Title 44 CFR Part 201 of the Disaster Mitigation Act of 2000. This legislation specifies criteria for state and local hazard mitigation planning which require local and tribal governments applying for Pre-Disaster Mitigation (PDM) funds to have an approved local mitigation plan. These may include countywide or multi-jurisdictional plans as long as all jurisdictions adopt the plan. Activities eligible for funding include management costs, information dissemination, planning, technical assistance and mitigation projects.

Oregon Senate Bill 360 (SB 360)

Senate Bill 360, known as the Oregon Forestland-Urban Fire Protection Act of 1997, is currently being implemented across Oregon on a priority basis. Currently, only Jackson and Deschutes Counties have been enacted. ODF recently hired one staff person to work on implementing SB360 in the Northeast Oregon (NEO) District, which covers 1.6 million acres in four counties: Umatilla, Union, Baker, and Wallowa.

The Oregon Legislature passed the law in response to several escalating problems such as:

- Wildland fires burning homes
- Firefighters risking their lives in conflagrations
- Rising suppression costs
- Reduced fire protection for wildland areas

Lawmakers concluded that dealing with the escalating issue of wildland interface fires must involve not only the fire protection agencies, but also the community leaders and individual property owners. It recognized that the Oregon landscapes vary considerably from the west of the Cascades to the central and eastern Oregon counties, and that one solution would not apply to all.

For the first time in Oregon, SB360 established a comprehensive and statewide policy regarding fire protection and mitigation in wildland-urban interface areas. It provides a process to define, identify, and classify the WUI. The Act has established standards for property owners to more effectively manage the hazards and minimize the risks that could ignite or spread fire on their property. It has also provided the means for establishing adequate, integrated fire protection systems in WUI areas, including education and prevention efforts.

Once SB360 is initiated in a county, a committee of local representatives will work with county officials to formally identify and classify their specific interface areas. Landowners will then be notified of the standards required to make their property less prone to damage or loss from wildfires. Property owners will have up to two years to evaluate their homes and lands, make minimum-standard modifications if necessary, and certify that their lands comply with The Act. Failure to obtain certification will subject landowners to a liability of up to $100,000 for the cost of suppressing any wildfire that ignited on their property and spread to other property, due to their failure to comply.

Oregon Statewide Land Use Planning Goals

Since 1973, Oregon has maintained a strong statewide program for land use planning. The foundation of that program is a set of nineteen statewide planning goals. The goals express the state's policies on land use and related topics. The program is a partnership among the state, administered through the Department of Land Conservation and Development (DLCD), and Oregon's cities and counties. Cities and counties implement the requirements of the statewide planning goals through state-approved local comprehensive land use programs.

Planning goals with particular relevance to WUI fire hazards are Goal 4 – Forest Lands, Goal 7 – Natural Hazards, and Goal 14 – Urbanization. Goal 4 requires local governments to minimize risks associated with wildfire when new dwellings or other structures are allowed in forestlands. Goal 7 requires local governments to develop programs to reduce risks to people and property from a variety of natural hazards, including wildfire. Goal 14 mandates that cities have urban growth boundaries (UGBs) to provide for- urban uses and limit urban-type development on rural resource lands outside of UGBs.

Umatilla County Emergency Operations Plan

The purpose of Umatilla County's Emergency Operations Plan is to ensure a coordinated, integrated response by the Umatilla County government, with maximum use of all resources, to mitigate the effects of any natural or man-caused disaster affecting the county. This plan specifies, to the extent possible, the core actions to be taken by Umatilla County, its municipalities, and cooperating private institutions to respond to a disaster situation. The plan is designed around the four phases of Emergency Management: Planning (Preparedness), Mitigation, Response, and Recovery. This plan was written to identify means to prevent disasters, if possible

(Planning); to reduce the vulnerability to disasters and to establish capabilities for protecting the public from the effects of disasters (Mitigation); to respond effectively to actual disasters (Response); and to provide for recovery in the aftermath of any emergency involving extensive damage to or debilitating influence on the normal pattern of life in Umatilla County (Recovery).

Umatilla County Natural Hazard Mitigation Plan (NHMP)

Umatilla County's Natural Hazard Mitigation Plan, currently being developed, is designed to provide direction to all jurisdictions in the county; eleven cities have participated in the planning process. County staff has met with each city council to discuss the county's project to develop a NHMP and to elicit their support for the project. A natural hazard mapping workshop (for small cities) was held to gather data from the city staff related to where their hazards are, what they are, and how to mitigate the effects of each potential disaster. The workshop was well attended and follow-up meetings were scheduled to make sure that all cities had an opportunity to map their hazards. Once the Umatilla County CWPP has been approved and adopted, it will become a chapter in the County's NHMP.

Umatilla County has received assistance from Oregon Emergency Management, FEMA, US Army Corps of Engineers, and the University of Oregon's Community Planning Workshop and Natural Hazards Working Group. The NHMP is a collaborative effort involving many citizens, agencies, non-profits entities, and local, regional, and state organizations. Along with staff from Umatilla County Emergency Operations and Planning Departments, the NHMP steering committee is comprised of representatives including Oregon Department of Forestry, NOAA, US Army Corps of Engineers, Hermiston Fire & Emergency Services District, OR Dept of Agriculture, and members of the public.

Local Fire Agreements

Wildland fire agencies work closely to provide statewide, comprehensive fire suppression services through agreements such as the 1998 Master Cooperative Fire Agreement and the Local Operating Plan approved in 2004. Partner agencies involved in this agreement include the Bureau of Land Management, Bureau of Indian Affairs, US Fish and Wildlife Service, USDA Forest Service, National Park Service, the State of Washington Department of Natural Resources, and Oregon Department of Forestry.

Locally, wildland fire agencies are actively involved in mutual aid agreements to share fire fighting equipment and fire fighters. Supplemental Agreements are also developed regarding the financial and procedural aspects of shared staffing and equipment, including the operations of the Pendleton Interagency Communications Center, referred to as PICC. There are eighteen partners in the Umatilla/Morrow Counties Fire and Emergency Services Mutual Aid Agreement. This is an agreement among recognized tribal, rural protection districts, and city fire departments, along with the Umatilla National Forest and the ODF Pendleton Unit, that allows for a

mutual assistance response in the bi-county area. Other mutual aid agreements exist with other volunteer fire agencies.

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[1] State of Oregon Emergency Management Plan, *Natural Hazards Mitigation Plan, Fire Chapter*, November 2003.
[2] http://www.communitiescommittee.org/pdfs/cwpphandbook.pdf
[3] Josephine County Integrated Fire Plan, August 2004.

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4. Planning Process

Umatilla County provided PL106-393 "Secure Rural Schools and Community Self-Determination Act of 2000" Title III funding to ODF to complete a community wildfire protection plan. Once funding was secured, ODF sent letters to various fire cooperators and interested citizens, inviting them to participate in the planning process. The process was patterned on a March 2004 document from the Society of American Foresters titled, *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities.* This handbook is a guide for local communities, but not a legal document, although the recommendations conform to both the spirit and the letter of the HFRA. The handbook outlines step-by-step recommendations to help communities develop a plan that addresses the core elements of community protection.

Local plans can be simple or as complex as the community desires. However, there are a few *minimum requirements* for a CWPP as described in the HFRA.

1) **Collaboration:** A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties.
2) **Prioritized Fuel Reduction:** A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.
3) **Treatment of Structural Ignitability:** A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.

HFRA requires that three entities must mutually agree to the final contents of the CWPP:

- The applicable local government (i.e., counties or cities)
- The local fire department(s)
- The state entity responsible for forest management

Step One: Convene Decision Makers

The development of the Umatilla County CWPP relied upon the collaboration of multiple agencies and organizations working together to define common goals and objectives. Once project funding was secured, ODF distributed letters to the primary wildland fire services cooperators in the county, inviting them to participate in the planning process as members of the Steering Committee or as resource advisors to the committee. Members of the Umatilla County CWPP Steering Committee were:

- Ray Denny – homeowner in the wildland-urban interface area
- Dale Jenner – forestry consultant

- Rob Burnside – Confederated Tribes of the Umatilla Indian Reservation
- Don Jackson – East Umatilla County Rural Fire District
- John Buckman – Oregon Dept. of Forestry (ODF), Committee Chair
- Tom Groat – Umatilla County Emergency Management
- Nancy Lee Wilson – Umatilla National Forest (UNF)
- Angie Johnson – ODF, GIS Support/Project Resource
- Marty King – Project Coordinator

Other resource advisors that participated in the project included:

- Jim Beekman – UNF
- Nancy Rencken – UNF
- David King – ODF
- JR Cook – County
- Amber Mahoney – UNF
- Dan Eddy – UNF
- Joani Bosworth – UNF
- Hal Thomas – City of Walla Walla
- Jim Stearns – Area 9 Fire Defense / Hermiston Fire & Emergency Services

The Steering Committee prepared this plan in compliance with the National Fire Plan, the 10-Year Comprehensive Strategy, Oregon Senate Bill 360, and Healthy Restoration Act. The plan is mutually agreed to and endorsed on the Signature Page by the three signing entities: the Umatilla County Commissioners, the NEO District Forester on behalf of ODF, and the County Structural Fire Representative, who mutually agree to the contents of the plan (see page 3). This plan is not legally binding and should be viewed as a working document and planning tool for fire and land managers of Umatilla County.

Fire Protection Managers in Umatilla County

There are several wildland fire protection managers working in Umatilla County. The following is a breakdown of those departments and agencies.

Oregon Department of Forestry - Pendleton Unit

The ODF Northeast Oregon (NEO) District is comprised of three Units: Wallowa, La Grande, and Pendleton. The protection boundary for the Pendleton Unit covers almost 535,000 acres in Umatilla, Grant, and Morrow Counties. ODF Pendleton Unit is the primary protection agency for 518,220 acres of non-federally owned forest and rangelands in Umatilla County. These lands lie primarily south and east of the foothills of the Blue Mountains and are all within the CWPP project area.

USFS - Umatilla National Forest

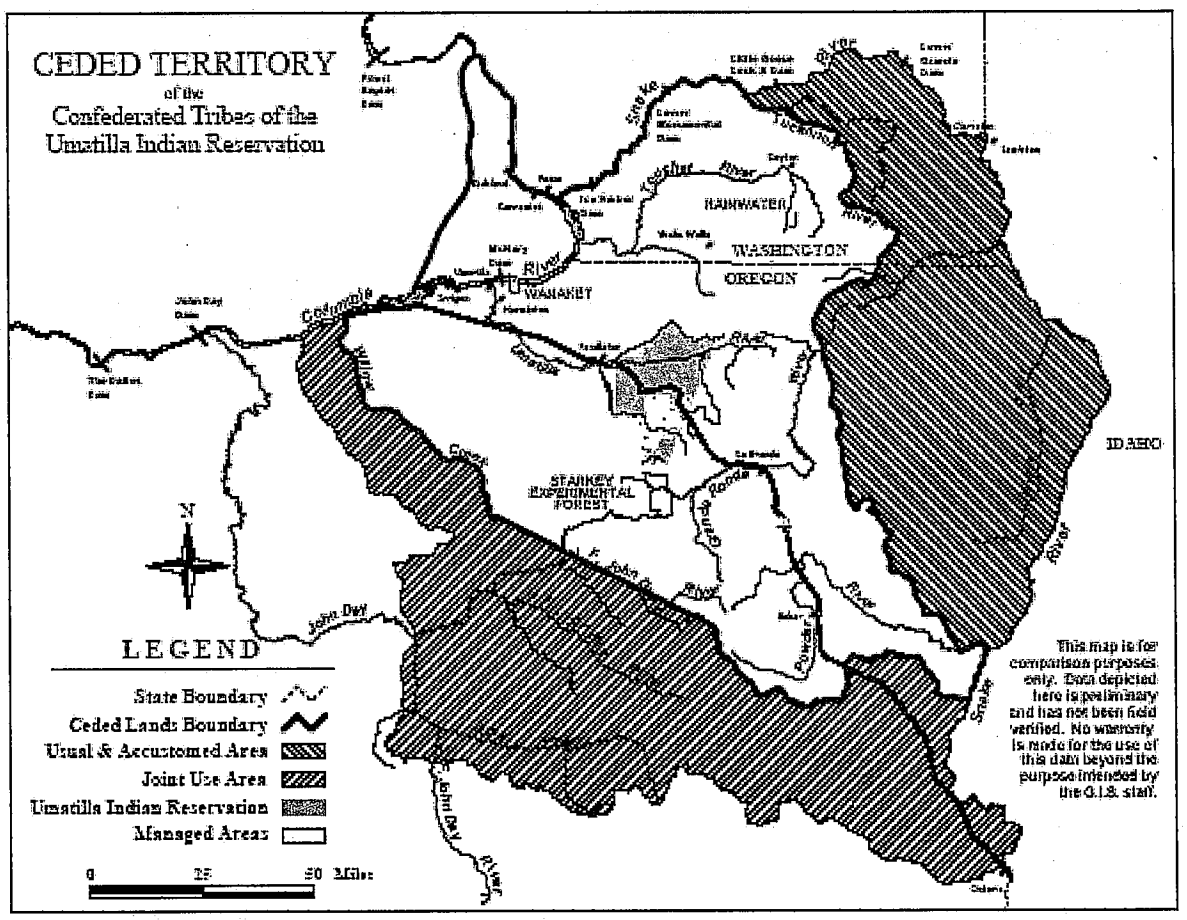
The Umatilla National Forest extends over 1.4 million acres in Oregon and Washington, and falls across eleven counties. Twenty-seven percent (375,669 acres) lies within Umatilla County and the CWPP project area. Two of the Forest's four Ranger Districts (the Walla Walla RD and the North Fork John Day RD) all have some portion inside the CWPP boundary. There are parts of two federal wilderness

areas that lie within the project area (North Fork John Day Wilderness and North Fork Umatilla). A third wilderness, the Wenaha-Tucannon Wilderness, is located in the northern Blue Mountains and straddles the Oregon-Washington border. This wilderness area is within 1-2 miles east of the county boundary and is the eastern boundary of Mill Creek watershed. It covers the northeastern corner of Umatilla County and the CWPP project area.

Confederated Tribes of the Umatilla Indian Reservation[4]

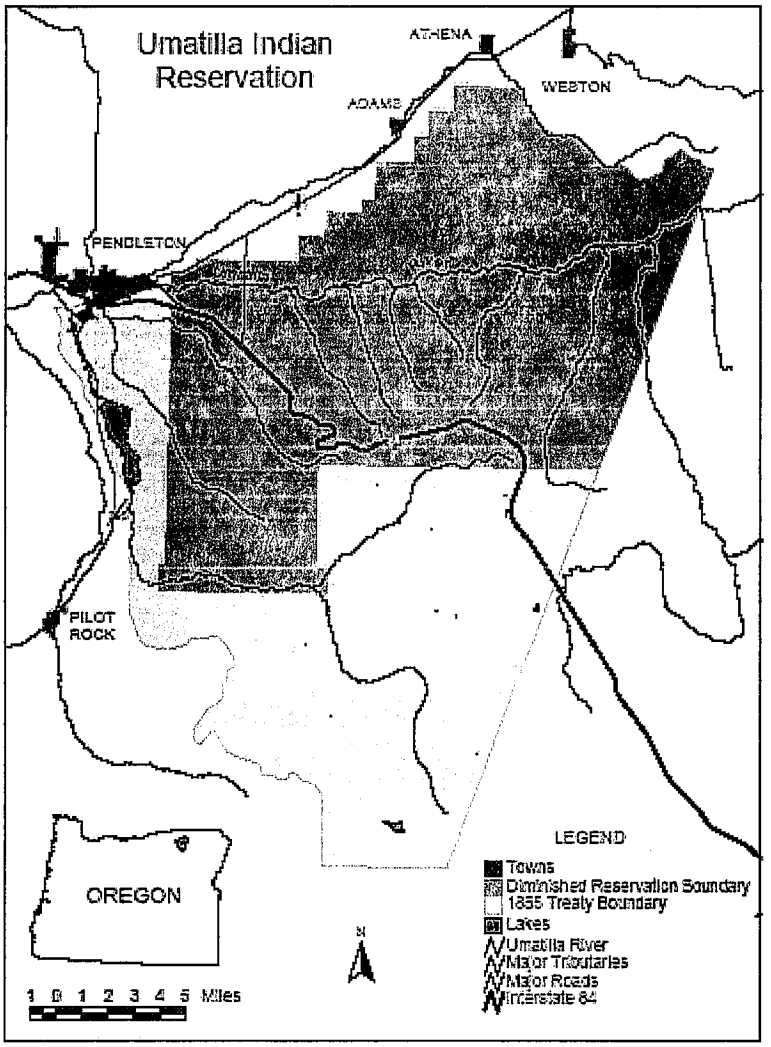
The people of the Cayuse, Umatilla, and Walla Walla Tribes make up the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). They were the first inhabitants on the Columbia River Plateau; they once had a homeland of 6.4 million acres in what is now northeastern Oregon and southeastern Washington. In 1855, the Tribes and the US Government negotiated a Treaty in which the Tribes "ceded" or surrendered possession of much of the 6.4 million acres in exchange for a reservation homeland of 500,000 acres (Figure 1).

Figure 1. Map of the Ceded Territory of CTUIR (taken from CTUIR website)



As a result of surveying and other federal legislation in the late 1800's that reduced its size, the Umatilla Indian Reservation today consists of 172,000 acres east of Pendleton and southeast of Pilot Rock (Figure 2).

Figure 2. Map of the Umatilla Indian Reservation (taken from CTUIR website)



The Bureau of Indian Affairs (BIA) has wildfire management responsibilities on tribal Trust and Indian-owned lands within the Umatilla Indian Reservation. Approximately half of those lands (over 54,000 acres) fall within the ODF protection district while CTUIR has roughly 13,500 acres of tribal owned lands within the ODF district. CTUIR is actively pursuing self-determination for management of Trust lands. This would shift the wildland fire protection responsibility for those affected lands over to the CTUIR Fire Department.

Rural Fire Protection Districts

Fire protection coverage in Umatilla County can be broken into two categories: structural and wildland. Most fire protection agencies provide one or the other, but some do handle both. The vast majority of the CWPP project area has fire protection coverage by at least one agency, with a few areas falling under multiple jurisdictions.

Rural fire protection exists in several incorporated municipalities within the CWPP project area including Ukiah, Pilot Rock, and Weston. The unincorporated community of Meacham and nearby residents has a volunteer fire organization that provides a level of wildland and structural protection. CTUIR Fire Department, along with the Bureau of Indian Affairs (BIA) provides wildland and structural fire protection within the reservation boundaries.

- East Umatilla County RFD has both volunteers and paid staff, and has three stations in its protection area. They provide both wildland and structural fire protection over 260 square miles northeast of Pendleton. Service is provided to a population of about 2,000 (1,000 in towns and 1,000 in rural setting), from the town of Weston up along Highway 204 into the Tollgate recreational area. (Service is also provided to the towns of Athena and Adams but both communities are located just outside the CWPP project area.) This WUI area has a high density of year-round dwellings and seasonal cabins, and is a major recreational destination in the Blue Mountains area. This is a tax-based supported district.

- Pilot Rock RFD, another tax-based fire district, is a volunteer department that provides fire suppression (both wildland and structural) for the City of Pilot Rock (population 1,540) and the surrounding 342 square miles. Difficult terrain with limited road access, as well as limited labor resources during daytime hours, provides unique challenges. Boundaries are adjacent to ODF protected lands as well as the Umatilla Indian Reservation.

- Walla Walla County Fire District #4 provides wildland and structural fire protection to some Oregon residents in the Mill Creek area through individual contracts. They provide service about two miles into Oregon (on County Road 582), but will go further up if requested under mutual aid agreement.

- The cities of Ukiah, Milton-Freewater, and Pendleton all have city-operated fire departments that provide wildland and structural protection inside their respective city limits. The Pendleton Fire Department also has contracted with three rural fire districts outside city limits to provide structural protection services; McKay Dam RFD, Lower McKay RFD, and Riverside RFD are all tax-based fire districts within five miles of Pendleton.

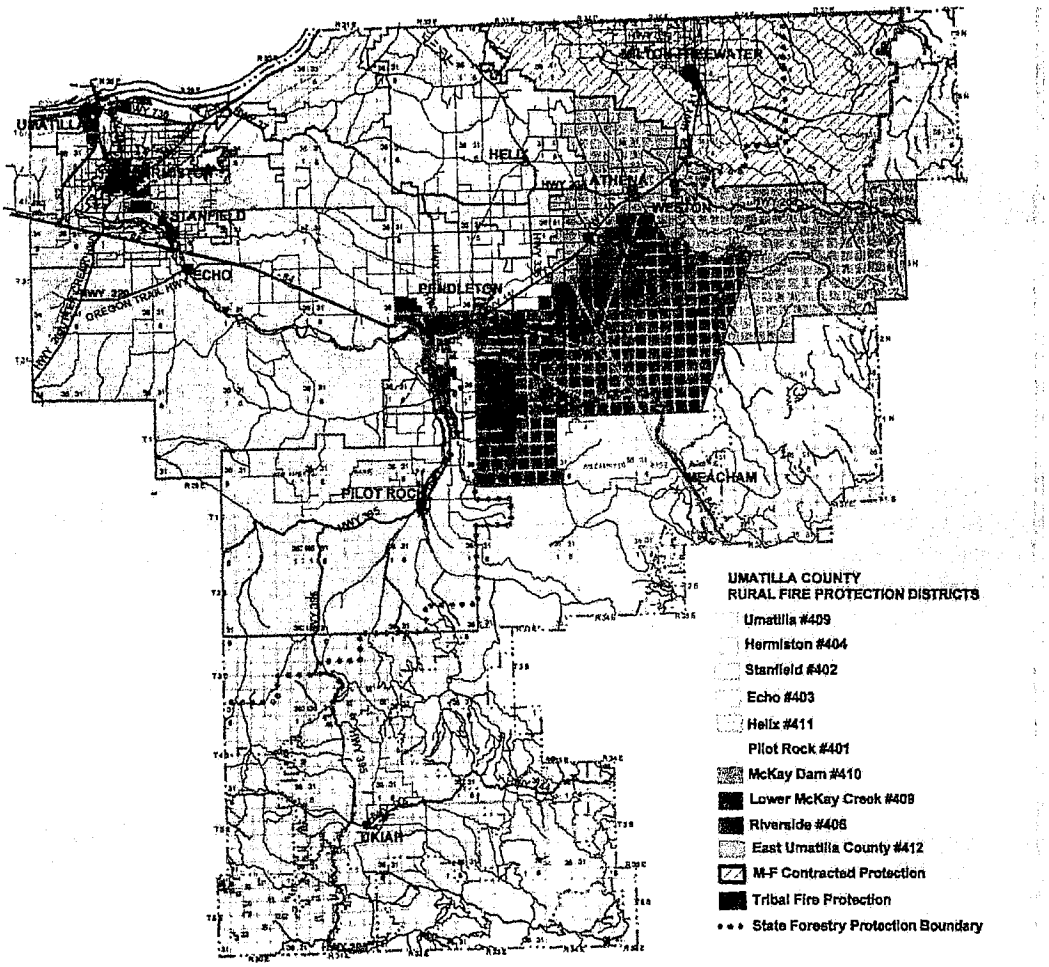
- Subscription service is offered in the northern end of the County through Milton-Freewater Rural Fire Department. They provide both structural and wildland fire suppression services to residents around the Milton-Freewater area on a

contractual paying basis. A mutual aid agreement has been in place between MFRFD and ODF for several years.

- The unincorporated community of Meacham, Oregon and its neighboring residents are provided with a level of wildland and structural fire protection through a volunteer fire department.

Figure 3 shows the locations of Umatilla County Rural Fire Protection Districts, in relation to ODF protection boundary and the tribal fire protection boundary.

Figure 3. Umatilla County Fire Protection Districts (Umatilla Co. Planning Dept. Feb. 2005)



This map was created for planning and research purposes only.
Umatilla County makes no warranties regarding the content, quality or adequacy of this information.

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June 14, 2005

Unprotected Lands

Umatilla County has land that is **unprotected,** both inside and outside the CWPP project boundary. These areas generally fall just outside of any agency's primary protection coverage. Examples include:

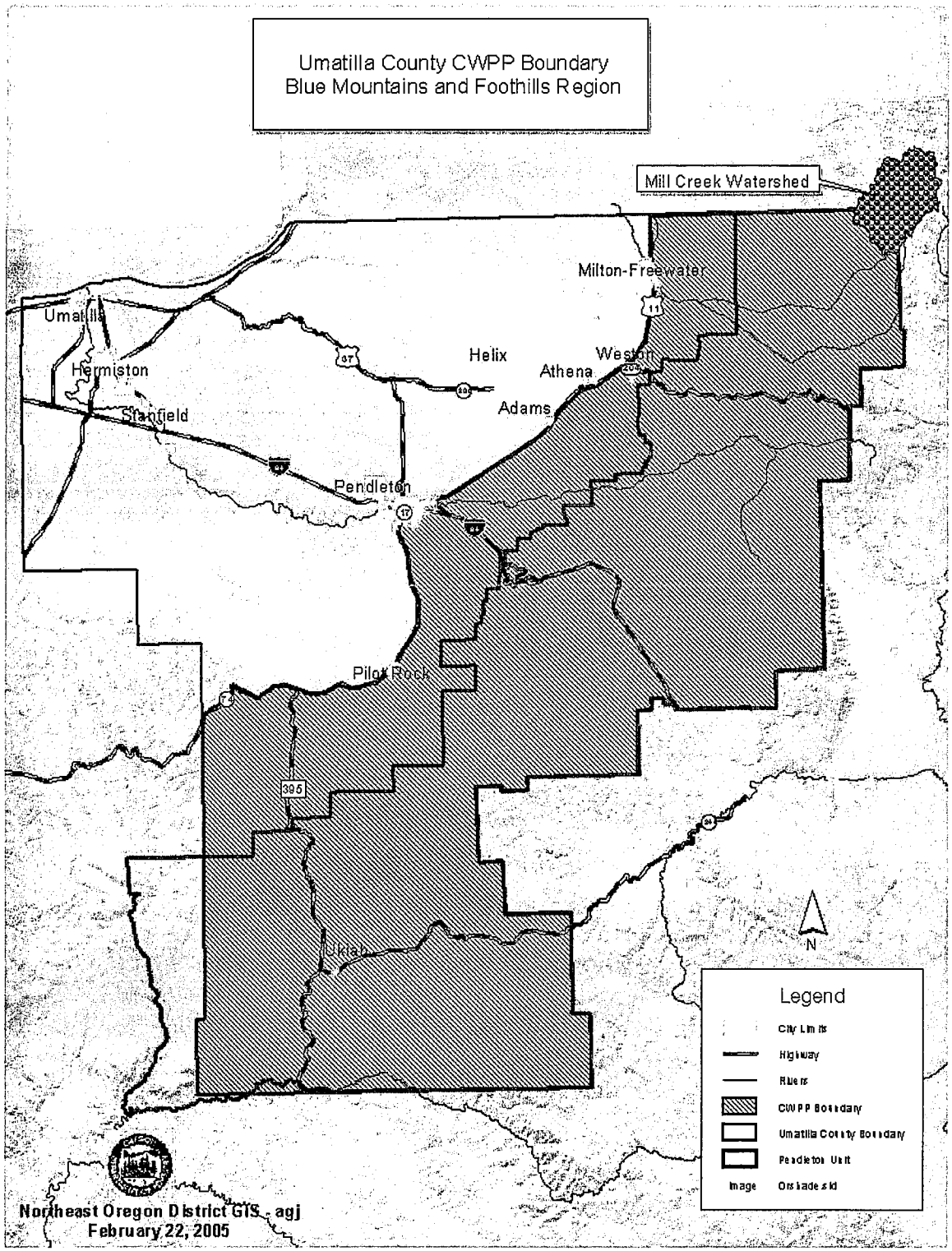
- Remote areas of Coombs Canyon, Birch Creek, and Reith (south and west of Pendleton)
- Several tracts of land between Highway 395 and the CTUIR reservation (east of Pendleton)
- The area between the southern border of Pilot Rock RFD and the ODF protection boundary (west of Gurdane and Cape Horn areas to county line)
- Areas on the north end of the county that fall outside of East Umatilla County RFD protection area and are not covered by contract through Milton-Freewater RFD

Fires that occur within unprotected lands become the responsibility of the Umatilla County Commissioners; coordination will be handled through the Emergency Management office and the Oregon State Fire Marshall's County Fire Chief to determine the appropriate response. In an attempt to deal with unprotected lands, the State Fire Marshall's Office, along with support from the Governor's Office, released a strategy for all counties to consider. (This proposal is discussed in detail in VII. Mitigation Action Plan.) As a long-term strategy, the CWPP committee encourages efforts that would provide some level of wildland fire protection coverage for all unprotected lands. This might include working with local government and rural fire districts to: 1) incorporate unprotected areas into already existing rural districts; 2) to help fund an additional substation in an existing rural district; or 3) attempt to form an entirely new fire district (tax-based). ODF's Eastern Oregon Area office (which includes Northeast Oregon units) has submitted a NFP proposal to address unprotected lands. At this time, no information has been received on grant awards.

Step Two: Establish Planning Area Boundaries

Umatilla County has a large and diverse landscape. The western side of the county (including Hermiston, Umatilla, Stanfield, and Echo) is predominantly low elevation desert and agricultural ground. The Blue Mountains range lies along the eastern border of the county, moving from rolling foothills to open pine grasslands, and then into steeper canyons with heavy mixed conifer stands. Because the urban interface areas are found along the eastern and southern borders of the county, the decision was made to use the established highway system as a project boundary line and focus planning resources on this eastern region. (State Highway 11 runs northeast from Pendleton to Milton-Freewater and the Oregon/Washington border. Highway 395 runs south out of Pendleton to the southern boundary of the county. Highway 74 breaks off from Highway 395 at Nye Junction, running west into Morrow County.) The CWPP project area is referred to as the Blue Mountains and Foothills Region of Umatilla County as shown in Figure 4. The remainder of the county will need to be covered under another CWPP.

Figure 4. Umatilla County CWPP Project Area



Mill Creek Watershed

The northern edge of Umatilla County borders the Oregon-Washington border (refer to Figure 4). Mill Creek Watershed is partially located in the northeastern corner of Umatilla County, about 15 miles east of Milton-Freewater. This watershed covers two states and four counties, including Umatilla County. Mill Creek Watershed falls within the Walla Walla Ranger District of the Umatilla National Forest and, as mentioned previously, is adjacent to the Wenaha-Tucannon Wilderness area.

Mill Creek Watershed is the primary municipal water source for Walla Walla, Washington. In 1918, the U.S. Secretary of Agriculture signed a cooperative agreement with the City of Walla Walla to conserve and protect the city's water supply. This agreement set aside the Mill Creek Watershed as a restricted management area, limiting the use of the area to activities that benefit water quality. The Forest Service retained resource management responsibility; a full suppression policy for all fires was implemented and a fire lookout was placed at Table Rock by 1930. Entry into the watershed became limited to persons holding permits for conducting management activities for the benefit of the watershed. This policy is still currently enforced by the Umatilla National Forest.

County Road 582 runs east-southeast from Walla Walla and is the main roadway into this canyon bottom area. It crosses back into Oregon and Umatilla County about 14.3 miles from the Walla Walla Post Office and dead ends at the City's intake facility's locked gate almost four miles further up the road. A network of Forest Service roads run along the watershed boundary, but the watershed itself is roadless. Both year-round residential homes and recreational cabins and trailers are found in the area leading up to the locked gate.

Because of the complexities associated with the Mill Creek watershed being the municipal water source for a major urban area, the Umatilla County CWPP will not address the closed watershed specifically. The City of Walla Walla is developing its own CWPP, which will include risk assessment and strategies more specifically addressing the Mill Creek watershed and the surrounding areas in both Oregon and Washington. Members of the Umatilla County CWPP Steering Committee have been and will continue to participate in the development of the City's plan, to ensure coordinated planning and implementation efforts as appropriate on the Oregon lands that are common to both CWPP documents.

The City of Walla Walla's CWPP Steering Committee has agreed to work collaboratively with appropriate agencies in the development of their plan. Upon completion of the City's CWPP, approval by the participating agencies, and being signed off by those representatives identified through the planning process, the City of Walla Walla's CWPP will be included in this document as Appendix A. At the next review of the Umatilla County CWPP, the document will be amended as deemed appropriate by the Steering Committee members.

Step Three: Establish Planning Goals

Mission Statement

Create a Community Wildfire Protection Plan for the Blue Mountains and foothill regions of Umatilla County.

Goals and objectives

- Promote wildfire awareness and target fire prevention and safety information across at-risk communities:
    - Coordinate community meetings to discuss fire related concerns with landowners
    - Distribute information on FireSafe home site standards

- Promote cooperative emergency fire response for the protection of life, property, and natural resources:
    - Identify resource equipment inventory, training needs and level of protection of participating fire agencies
    - Review interagency communications and suppression strategies for emergency fire response situations

- Identify and reduce hazardous fuels and coordinate risk reduction strategies across the landscape:
    - Develop and utilize a common set of base information for risk assessment
    - Promote landowner assistance programs
    - Gather local and community knowledge of fire related concerns through public outreach
    - Prioritize fuel reduction areas and projects

- Monitoring and Evaluation
    - Evaluate the progress of the plan annually and recommend changes as needed
    - Conduct monitoring of selected projects and activities to assess progress and effectiveness

Step Four: Community Outreach and Education Resources

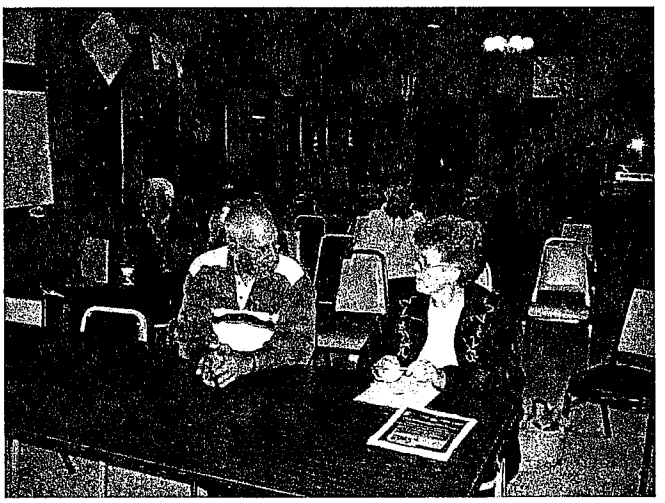
CWPP Public Meetings

The CWPP relies on input from citizens and communities about what they perceive to be most at risk from a wildfire event and what they value most about their surroundings. A series of five public meetings were held across Umatilla County during November 2004. The purpose was two-fold: first, to inform interested citizens of the planning effort covering the WUI areas of the County, and second, to gather information from the local knowledge base about the risks of wildfire events specific to their communities. These meetings were helpful in identifying the values and

resources that the communities and residents wanted most strongly to protect from wildfire.

Information about the CWPP project and upcoming meetings was distributed across the region. An informational brochure was created providing background and local project information; a public meeting flyer was designed listing dates and locations. Over 150 brochures and meeting notices were distributed to local agencies, businesses, and community gathering places such as grocery stores, hardware stores, city halls, and post offices. Information was also posted on ODF and Umatilla County websites. Packets of information were also mailed to over 200 property owners in the forested areas, including NFP cost-share project participants and homeowner associations. In addition to the brochure and meeting flyer, these packets also included introductory letters and a postage-paid questionnaire asking them about what they've already done on their property to decrease hazards from wildfire and what they valued most about living in the wildland-interface areas of the County.

Each public meeting included a PowerPoint presentation followed by discussion and a question and answer session. Various members of the Steering Committee attended each meeting, and overall, 35 private citizens participated in the meetings.



Meadowood Speech Camp on November 18, 2004.

Meetings took place in strategic areas across the county:

- Meacham Fire Station in the community of Meacham
- Meadowood Speech Camp off Hwy 244 in the Weston Mtn/Tollgate area
- Ukiah Senior Center in the City of Ukiah
- Pilot Rock Community Center in the City of Pilot Rock
- CTUIR Fire Station in Mission, on the Umatilla Indian Reservation

CTUIR Fire Dept. on November 30, 2004.

Out of 205 total informational packets mailed, 70 were sent to property owners living in Oregon towns outside the immediate area, Washington State, and California. There was a questionnaire return rate of 20%.

Results from the returned forms of this informational questionnaire include:

- 61% reported an awareness of programs such as Firewise or Living with Fire
- 58% had participated in some type of cost-share NFP fuel reduction project
- 76% have taken steps to protect their home/property and to reduce the risk from wildfire
- 73% have property located in Weston Mountain/Tollgate or Meacham areas

Another public meeting occurred on April 14, 2005. It was conducted jointly by the Umatilla County CWPP and the City of Walla Walla Mill Creek Watershed Committee. The meeting was held at the Walla Walla County Fire District #4 station and was targeted to the residents of the Mill Creek area. Around forty people attended and heard general fire season information presented by Oregon Department of Forestry and Washington Department of Natural Resources (WA-DNR) representatives. A Firewise slide presentation was used to help illustrate different ways for residents to protect their homes and property from a possible wildfire event in the area.

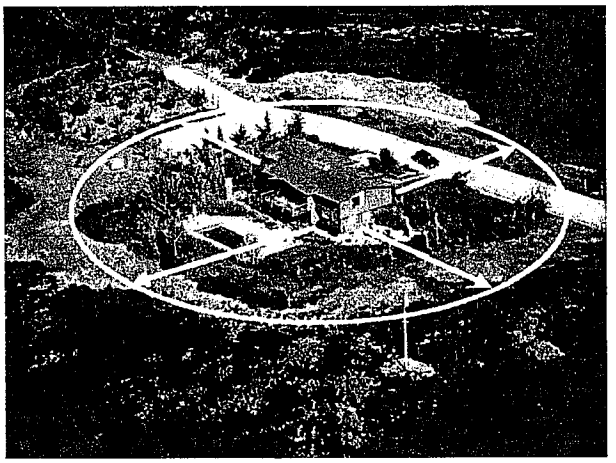
Other Fire Prevention Education Resources

As more of the population migrates from high-density urban areas into rural and forested regions of Oregon, whether for lifestyle or economic reasons, the number of large wildfires affecting homes has escalated dramatically. Many people take with them an expectation of structural fire protection similar to the urban area they left behind. The property owner in the wildland-urban interface area is the first-line of defense against the wildfire event. Homeowners and forest landowners need to be aware of and understand the types of hazards found in this environment, and become active participants in defending their property.

Cost-Share & Rebate Grant Programs through National Fire Plan

Over the last three years, ODF has secured over $800,000 in grant dollars to assist private landowners in Umatilla County with fuels reduction projects, distributed to landowners in cost-share and rebate programs. Rebate dollars have been used for the homesite assessment project, with ODF completing assessments on all structures within the WUI areas. A maximum of $580 per property for vegetation removal and other activities to create survivable space around structures was offered to landowners. Interested property owners were provided technical advice as to what could be done to decrease the structural ignitability rating for their property. All structures within the WUI areas have been geo-referenced for future planning needs by ODF and the county. To date, over 70 contracts have been written for work around homesite structures.

Cost-share dollars were targeted to the landowner with larger acreages within the WUI, and even more ideally, adjacent or near federal land. This program offered cost-share funds of 33-75% (depending on the funding source) for pre-commercial thinning, slash removal, brush removal, and/or ladder fuel removal. From October 2002 through April 2005, 1680 acres of fuels reduction has occurred in the ODF Pendleton Unit. Another 1200 acres are currently signed up and scheduled for completion by the end of 2005.



Living with Fire

This national prevention program guides homeowners step-by-step through the process of eliminating hazards around their home. This newspaper publication shows how to create survivable space around your home, taking into account the topography and vegetation that surrounds it. It has previously been provided to homeowners in Umatilla County. The newspaper is available locally through ODF or on-line at www.or.blm.gov/nwfire/docs/Livingwithfire.pdf.

Firewise

This is a program developed by the National Fire Protection Association (NFPA) and features templates to help communities reduce risk and protect property from the dangers of wildland fires. Along with an interactive and resource-filled website full of free materials, the program offers training throughout the nation. A Firewise workshop was held in 2001 at CTUIR's Tamastslikt Cultural Institute for local agencies. For information concerning the Firewise program, visit online at http://www.firewise.org.

FireFree

Developed in Oregon, this model predates the more recent and nationally known Firewise. In 1997, four local agencies in the Bend area joined with SAFECO to create "FireFree! Get in the Zone", a public education campaign designed to increase resident participation in wildfire safety and mitigate losses from wildfire. The campaign aims to educate the public about wildfire safety and promote behaviors and attitudes that translate into creating defensible space around homes and businesses. The partnership includes the Bend Fire Department, Deschutes County fire agencies, City of Bend Development Service, the Deschutes National Forest, Oregon Department of Forestry, the Office of the State Fire Marshall, Keep Oregon Green, and other local, regional, and federal partners, including private businesses. For more information, check out the website at http://www.firefree.org/.

Fire-Resistant Plants for Oregon Home Landscapes

The OSU Extension Service in Redmond has developed a pamphlet suggesting specific types of vegetation that may reduce wildfire risk around the home. Most people landscape their property with aesthetics in mind, not thinking about whether a plant or shrub material is flammable and could actually increase the risk around their home. This brochure describes the different plant materials that homeowners can use for landscaping that will complement their home while improving the chances of their home surviving a wildfire. Brochures have been distributed at public meetings and are available at the ODF office or through the OSU Extension Service office in Redmond. Visit their online site at http://www.extension.oregonstate.edu/emergency/FireResPlants.pdf.

> ***Fire-resistant*** plants are plants that don't readily ignite from a flame or other ignition sources. Although fire-resistant plants can be damaged or even killed by fire, their foliage and stems don't contribute significantly to the fuel and, therefore, the fire's intensity.

Step Five: Establish a Project Base Map & Develop a Community Risk Assessment

A base map of the project area was developed using Oregon Department of Forestry and Umatilla National Forest data and created within the Forest Service projection NAD27 UTM11North. Geographical Information System (GIS) based maps were provided to the Steering Committee who made assessments and recommendations regarding protection and risk-reduction priorities based on this information.

A community risk assessment was developed to help the committee prioritize areas for treatment and identify the highest priority uses for available financial and human resources. Factors considered in the assessment included (vegetative) fuel hazards; the risk of wildfire occurrence; homes, businesses, and essential infrastructure at risk; other community values at risk; and local preparedness and firefighting capability. A rating of high, medium, and low was used to represent the level of risk to

the community posed by each factor. This information was incorporated into the base map as appropriate.

Step Six: Establish Community Priorities and Recommendations

Results of the risk assessment were discussed from both a project basis and individual at-risk communities and WUI areas across the county. The Steering Committee discussed a range of alternatives addressing wildfire concerns on both federal and non-federal lands within the WUIs. Recommendations were developed and prioritized for projects on both federal and nonfederal lands in the WUI areas, along with the preferred treatment methods for those projects. Recommendations were noted as to whether they were related to the protection of communities and essential infrastructure or to reducing wildfire risks to other community values. Specific recommendations by WUI areas are captured in the Mitigation Action Plan in Section VII. Types of projects considered include:

- Hazardous fuels (mechanical) reduction treatment
- Prescribed fire
- Reducing structural ignitability
- Improving fire response capability of fire protection agencies
- Improving emergency preparedness
- Target educational efforts at homeowners in the WUI areas

Step Seven: Develop an Action Plan and Assessment Strategy

Before finalizing the CWPP, the committee will develop an action plan that identifies roles and responsibilities, funding needs, and timetables for carrying out the highest priority projects. An assessment strategy will be agreed upon to ensure that the document maintains its relevance and effectiveness over the long term; this may be accomplished by reconvening the Steering Committee on an annual basis.

Step Eight: Finalize CWPP

The final step in developing the CWPP involves the Steering Committee to reconvene and mutually agree on the fuels treatment priorities, preferred methods for fuels treatment projects, the location of the wildland-urban interface areas, structural ignitability recommendations, and other information and actions to be contained in the final document. If an associated action plan has not been developed, the committee should identify a strategy for conveying the results of the planning process to community members and key land management partners in a timely manner. (A combination of newsletters, public meetings, mailings, and handout material designed to reach the maximum number of property owners in the planning area was identified.)

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[4] http://www.umatilla.nsn.us/geninfo.html

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5. Umatilla County Profile

Historical

The creation of Umatilla County in 1862 can be traced back to the regional gold rushes, which spawned the riverport of Umatilla City and brought stock raisers to the lush grasslands. Pendleton was selected as the county seat in the 1868 election, succeeding Marshall Station and Umatilla City. Although Lewis & Clark and the Oregon Trail pioneers passed through the area, Umatilla County did not flourish until the railroad arrived in 1881 and following the development of dryland wheat farming. The first census in 1870 counted 2,916 inhabitants. Population eventually shifted to the north and eastern parts of the county after the Pendleton area opened up due to the increased wheat production.

Environment

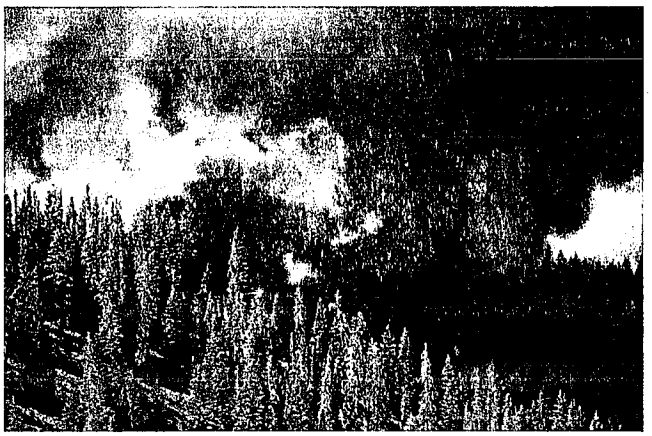
Umatilla County has an area of 3,231 square miles. From an elevation of 296 feet at Umatilla, the county rises to an elevation greater than 5,800 feet in the Blue Mountains on its eastern boundary. Umatilla County is bordered by the Columbia River and Walla Walla County, Washington, to the north, Morrow County to the west, Grant County to the south, and Union and Wallowa Counties to the east. The Umatilla River originates in the Blue Mountains along the eastern boundary and flows generally westward across the Columbia Plateau approximately 100 miles, discharging into the Columbia River at the town of Umatilla.

The basin has a continental climate with a winter precipitation pattern. Precipitation levels vary from 8-10 inches along the Columbia River, to as high 60 inches in the higher elevations of the Blue Mountains[5]. Peak flows in the Umatilla River normally occur in the spring with high elevation snowmelt and diminish throughout the summer to the lows in August or September.

Weather Emergencies

According to a Hazard Vulnerability Analysis, part of the county's Emergency Operations Plan adopted in December 2003, weather emergencies pose the greatest risk to the residents of Umatilla County. A dust storm swept across the I-84 corridor in September 1999, setting up a chain reaction accident killing seven people. In December 2003, an intense winter storm dropped snow, ice, and freezing rain on a significant portion of the county, closing I-84 for several days; 27 Oregon counties, including Umatilla County, were included in a Presidential Disaster Declaration.

Wildfire continues to be a significant threat in the county. Approximately 12% of Umatilla County consists of forestland used by the timber industry and small-woodland owners, and for recreation activities by the public. The forestry sector employment has declined dramatically in recent years primarily because of harvest reductions on national forest lands. Insect and disease damage, along with wind and ice storm damage add to the increasing fuel load on timber ground. Additionally, around 10-15% of the area's cropland has been retired from crop production, enrolled in the Conservation Reserve Program, and seeded to grass, shrubs, and trees. The threat of fires from large areas of rangeland and dry land crops adjacent with the higher fuel-load areas of timber and structures in residential interface areas continues to increase.



Demographics

Umatilla County has twelve incorporated areas and two-thirds of the total population resides in these incorporated areas. Only two incorporated communities are completely within the CWPP project area (Weston and Ukiah) while three more have portions partially inside the boundary (Pilot Rock, Pendleton, and Milton-Freewater). According to the US Census Bureau's estimate for 2000, Umatilla County's population totaled 70,548 residents, ranking 12th among Oregon counties. The majority of these people (51.2%) live in rural areas and towns of less than 2,000 people. In 2000, approximately 49% of the county's population lived in the three largest towns, all found along the mainstem Umatilla River: Pendleton (population 16,354), Hermiston (population 13,154), and Umatilla (population of 4,978). The overall population of Umatilla County is somewhat racially diverse, with 16% Hispanic or Latino origin, and 3.4% Native American.

Residents of Umatilla County primarily live in single-family homes that were built in the 1970's. Most homes are valued below $100,000 (median home value at $98,100), and in 2000 there was a home ownership rate of 64.9%. There were 325 housing units authorized by building permits in 2002.

CTUIR currently has 2,446 enrolled members, down from an estimated population of 8,000 prior to European contact. About 1,500 American Indians and approximately 1,500 non-Indians live on the Umatilla Indian Reservation. Of the current Reservation acreage, approximately 52% is under Indian ownership, and 48% is non-Indian owned. About 51% of the Native American population resides primarily on the Reservation.

Economy

Water, in the form of irrigation, has been a key to the economic diversification and growth of Umatilla County, which includes agriculture, forest products, tourism, manufacturing, recreation, aggregate production and power generation. According to Oregon State statistics, there were over 36,000 jobs in Umatilla County as of May 2003. Private sector employment leads the list followed by manufacturing, trade, transportation and utilities, local government, education and health services. Food manufacturing accounts for a significant number of jobs.

The county is regarded as one of the state's major agricultural centers and ranked fourth in the state in agricultural commodity sales in 2002. The agriculture sector is divided into two segments, production (growing) and processing, with the production side accounting for $50 billion a year. Wheat is the major commodity, followed by cattle and potatoes. Hay and vegetables are also large contributors, with vineyards, canola, and other alternative crops emerging as new commodities. There are essentially two irrigated regions in the county: the west end near Hermiston, known for its watermelons, potatoes, and other vegetables, and the north near Milton-Freewater, known for its fruit orchards. The central part of the county is mainly dryland farming, with wheat as the primary crop, and other grains, canola, and peas as secondary crops. Limited timber harvesting still takes place in the south and eastern parts. Livestock, mainly cattle and some sheep, are found throughout the county.

Recreation opportunities in the Blue Mountains and tourism events, including the annual Pendleton Round-Up rodeo, the Pendleton Woolen Mills, McNary Dam, and Recreation Area are becoming increasingly important to the local economy. CTUIR is now the second largest employer in the county with roughly 1,000 employees (CTUIR website). Wildhorse Casino & Resort, with its hotel, RV Park, and golf course is considered a destination attraction for many people. Tamastslikt Cultural Institute, opened in July 1998, is considered its centerpiece attraction.

Land Use and Ownership

Umatilla County has an area of 3,231 square miles (approximately 2.07 million acres). The Umatilla County CWPP is focused only on the south and eastern parts of the county, referred to in the plan as the Blue Mountains and Foothills region; this project area is approximately 56% of the entire county and encompasses all of the

forestland, interface areas. The Umatilla National Forest manages 375,669 acres of federal forest in Umatilla County, while ODF protects 520,000 acres of private and non-federally owned forest and grazing lands.

According to a 1980 Umatilla County Planning Land Uses Report, the breakdown by land use classification was as follows:

Land Use	Acres	%
Range	760,000	36.9%
Cropland	700,000	34%
Forested	520,000	25.2%
Urban and Built-up	40,000	1.9%
Pasture	36,000	1.7%
Lakes, Rivers, and Streams	4,000	0.2%

Transportation

Umatilla County is a major transportation hub in northeastern Oregon, linked to areas in the Northwest by freeway, railway, and river. Umatilla County is bisected by Interstate 84, running west to east up over the Blue Mountains. U.S. Highway 395 runs north to south down into Grant County, while Highway 11 is the major artery running northeast out from Pendleton through Milton-Freewater, Oregon and into Washington State. In addition to the road system, there are also significant water transportation facilities along the Columbia River, including the Port of Umatilla. The Union Pacific Railroad travels east and west the length of the county.

[5] http://www.wrh.noaa.gov/mfr/climo/AvgAnnPcpnOR.gif

6. History of Wildfire in Umatilla County

In one of the oldest accounts dated 1904, W.H.B. Kent, in describing the proposed Wenaha Forest Reserve (now fully incorporated into the Umatilla National Forest) wrote:

> "Practically every portion of the reserve has suffered more or less from fire. The largest and most important of these was one which came from the present Umatilla Indian Reservation about fifty years ago, burned up the river Umatilla, into the Reserve, then turned north along the west slope, across the heads of the Walla Wallas, and reached as far as the head of the Wenaha. This burn has generally restocked finely, principally to tamarack and lodgepole pine."

The fire area Kent describes is over 60,000 acres with much of it in what is now Umatilla County.

Types of Wildfires[6]

Wildfires burn primarily in vegetative fuels outside the urban areas. Wildland fires require some type of suppression response because they are burning out of control or are threatening to spread out of control. Wildland fires can generally be categorized as agricultural, forest, range, or wildland-urban interface fires.

- An *agricultural fire* burns in areas where the primary fuels are flammable cultivated crops such as wheat. This type of fire tends to spread very quickly, but is relatively easy to suppress if adequate resources are available.

- The classic example of a wildfire is the *forest setting*. Timber fuels this type of fire, along with associated fuels such as brush, grasses, logging residue and thick stands of reproduction. The forest type of wildfire can be extremely dangerous and difficult to suppress due to fuel and topography factors. These fires are often very costly to suppress.

- *Range fires* burn across ground typically used for grazing or wildlife management purposes, and are typically open landscapes that lack heavy stands of timber or large accumulations of fuel. Juniper, bitterbrush, and sage are common fuels involved in a range fire.

- *Wildland-urban interface fires* occur in portions of the state where urbanization and natural vegetation fuels allow a fire to spread rapidly from natural fuels to structures and vice versa. Structural suppression resources can be quickly overwhelmed, especially in the early stage of such fires, increasing the number of structures destroyed. Nationally, these wildland interface fires commonly produce widespread losses since large numbers of structures are

simultaneously exposed to fire. So far, the level of property losses for Oregon is not as high as neighboring states.

Probability

Wildfires in Oregon are inevitable. The majority of wildfires burn during the July to October period. Extended dry periods during the winter months can combine with winds and dead fuels, often resulting in fires that burn with a greater intensity and rate of spread. Other factors influencing the occurrence and severity of wildfires include poor forest health, abnormally high amounts of vegetation arising from a century of aggressive fire exclusion, and long-term changes in weather patterns.

On an average year, there are approximately 2,500 wildland fires ignited on forest and range lands in Oregon. Approximately two-thirds of these fires are caused by human activity; the other third is due to lightning. While data show a downward trend in the number of wildland fires per 1,000 population over the past ten years, the number of acres being burned in these fires, and the frequency of structural losses, has been growing.

Wildland Fire Risk

Wildfire risk refers to the chance of a wildfire starting. Fire starts are recorded as either statistical (stat) or non-statistical fire starts (non-stat). Fire starts are also categorized as either lightning or human caused. Human-caused fires are further broken down into eight categories: railroad activity, small or heavy equipment use, recreational activities, smoking, debris burning, arson, juveniles, or miscellaneous (a catchall group that also includes fires started by automobile accidents).

Statistical Fire (Stat):
A fire that originates on land protected by the reporting, jurisdictional agency and that requires some level of fire suppression action.

For example, a fire that started on federal forest ground would be reported as a Stat Fire by the reporting USFS office, but reported as a Non-Stat fire by ODF if they also responded to the fire and provided suppression activity.

Fire starts pertaining to lands protected by state and federal agencies go back a couple decades. However, comprehensive computer-based summaries for tribal and RFPDs are not yet readily available. State and federal fire data can be used to interpolate fire risk within the CWPP boundary. Fire starts in these districts are often captured as non-stat fires by either ODF or UNF.

Fires on Federal Lands

A detailed fire history for the Umatilla National Forest dating to 1970 is available in achieved fire reports. Less specific information on fires prior to 1970 can be found in various Forest reports.

In 1996, four major fires burned 72,000 acres on the Forest: Wheeler Point (8,236 acres), Bull Complex (8,332), Summit (37,835), and Tower (50,633). Some of these fires burned across protection boundaries and consumed an additional 33,000 acres. Suppression costs for the four fires exceeded $29,000,000.

Tower Complex began on August 13, 1996 burning a total of 50,633 acres of which 46,000 were in Umatilla County. This was a lightning caused fire. More than 28,000 acres of this burn were in roadless and wilderness areas. Total suppression costs approached $25 million dollars.

Human caused fires often start on lower slopes and can burn rapidly uphill. The Meacham Canyon railroad right-of-way has been the source of many large fires, including the Milepost 244 Fire. This fire began on August 15, 2000 and burned a total of 4,800 acres of private and federal lands. The fire was started by a passing freight train in the Meacham Canyon. Suppression costs exceeded $3,000,000.

1970-2004 Statistics

From 1970 to 2004 there were 4,592 fires reported on the Umatilla National Forest. Sixteen of these burned more than 1,000 acres. Lightning started 3,089 fires (66%) and burned a total of 149,034 acres. Human starts for the same period total 1,503 (33%) and burned a total of 45,843 acres. The average annual area burned for the 35 fire seasons (1970-2004) is 5,568 acres.

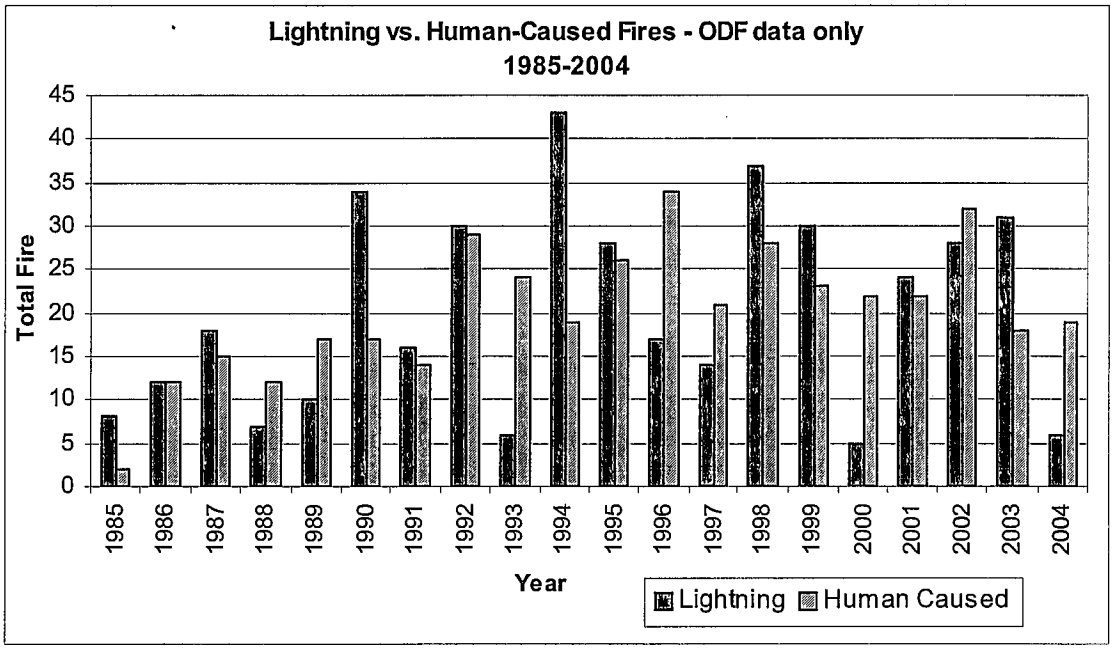
1970-2004 Fire Seasons	Lightning Caused	Human Caused
Number of Fires by Cause	3,089	1,503
Acres Burned by Cause	149,034	45,843
Acres Burned Per Fire	48	30

Lightning fires are more prevalent on federal lands. Lightning storms tend to build up over mountainous terrain. Much of the high mountainous terrain is in federal ownership. That fact coupled with fewer forest residents on federal land contribute to the fact that lightning fires are the source of 66% of fires on federal lands. Fires in rural fire protection districts and state protected lands are closer to a fifty percent split between lightning and human caused.

Fires on State Protected Lands

The total number of ODF Pendleton Unit fires (Stat and Non-Stat) from 1985-2004 is shown below as lightning versus human caused (Figure 5). For twelve out of the last twenty years the number of lightning caused fires was equal or greater than the number of human caused fires.

Figure 5. Total Number of ODF Fires: Lightning vs. Human Caused Fires (1985-2004)



Historical data for ODF statistical fires going back to 1960 is shown in Table 1 as the percentage of fires by general cause, either lightning or human related. Categories are broken into five periods: the last 5 years, 10 years, 20 years, 30 years, and 45 years respectively. For example, the 5-year average shows that 47% of all fires in this period were caused by lightning while 53% were human related (debris burning the leading cause). Slightly more than half of all fire starts during the last 45 years are attributed to lightning. Table 2 shows the number of fires averaged by the same period.

Table 1. ODF Pendleton Unit – Percentages & Trend Data of Statistical Fires by General Cause

	Lightning	Railroad	Equip Use	Recreation	Smoking	Debris Burn	Arson	Juvenile	Misc	Total Fires
45 Yr Avg.	52%	6%	12%	8%	5%	9%	2%	1%	5%	100%
30 Yr Avg.	50%	4%	13%	9%	4%	11%	2%	1%	5%	100%
20 Yr Avg.	51%	5%	14%	8%	3%	12%	2%	1%	6%	100%
10 Yr Avg.	49%	6%	14%	8%	3%	10%	3%	1%	5%	100%
5 Yr Avg.	47%	7%	10%	7%	3%	14%	5%	1%	5%	100%

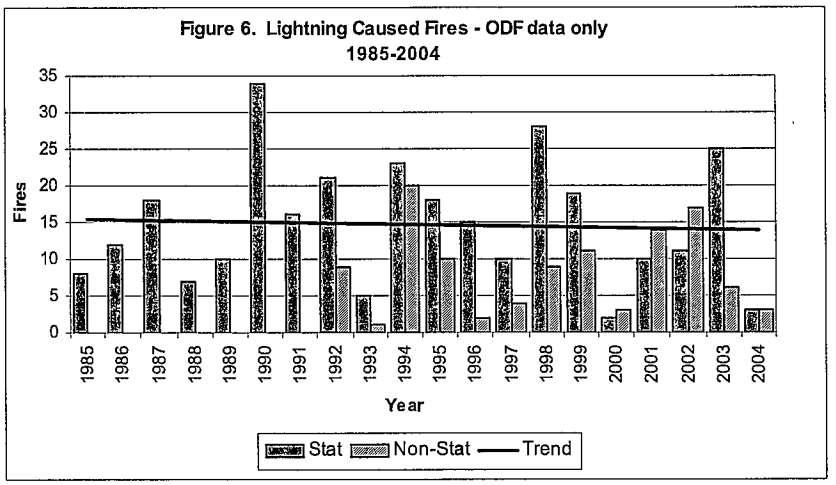
Table 2. ODF Pendleton Unit – Average Number of Statistical Fires by General Causes

	Lightning	Railroad	Equip Use	Recreation	Smoking	Debris Burn	Arson	Juvenile	Misc	Total Fires
45 Yr Avg.	12.3	1.3	2.8	1.9	1.2	2.0	0.4	0.3	1.2	23.5
30 Yr Avg.	13.2	1.2	3.5	2.4	1.1	2.8	0.5	0.2	1.4	26.2
20 Yr Avg.	14.8	1.4	4.1	2.4	0.8	3.4	0.6	0.3	1.7	29.2
10 Yr Avg.	14.1	1.8	3.9	2.4	0.8	2.9	0.9	0.2	1.5	28.5
5 Yr Avg.	14.0	2.2	3.0	2.2	0.8	4.2	1.4	0.4	1.4	29.6

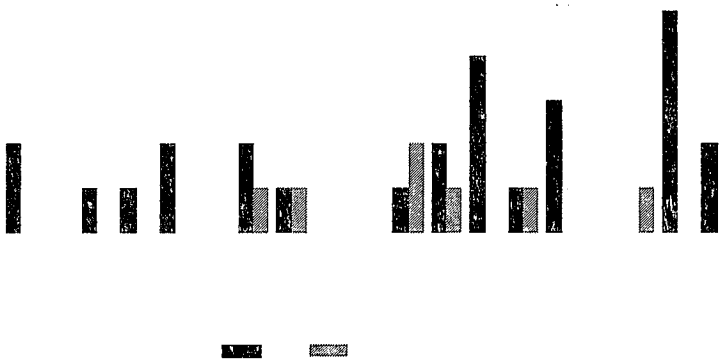
Trend Information for Fires on State Protected Lands

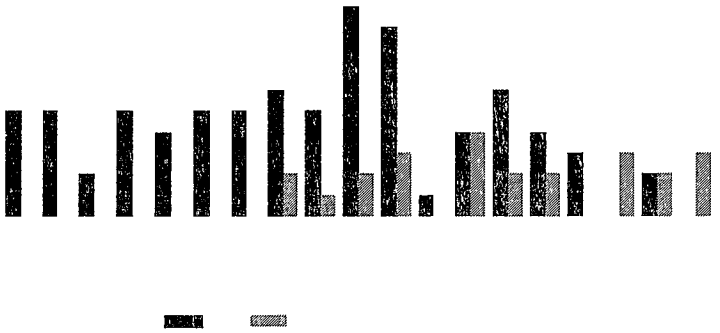
The following graphs shown below (Figures 6-14) reflect data collected from those lands protected by the ODF Pendleton Unit and are used to provide an illustration of trends on those non-federal lands. The trend lines may not be statistically valid.

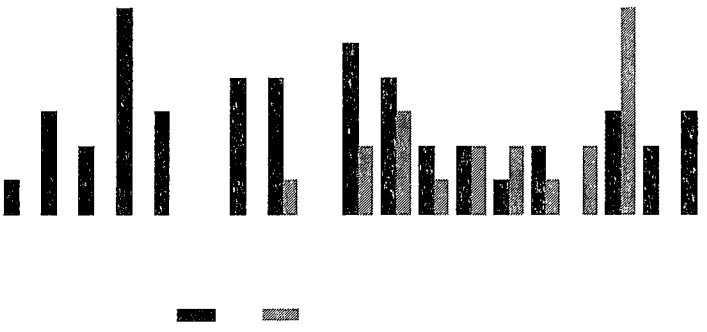
Figure 6. Lightning Caused Fires - ODF data only
1985-2004

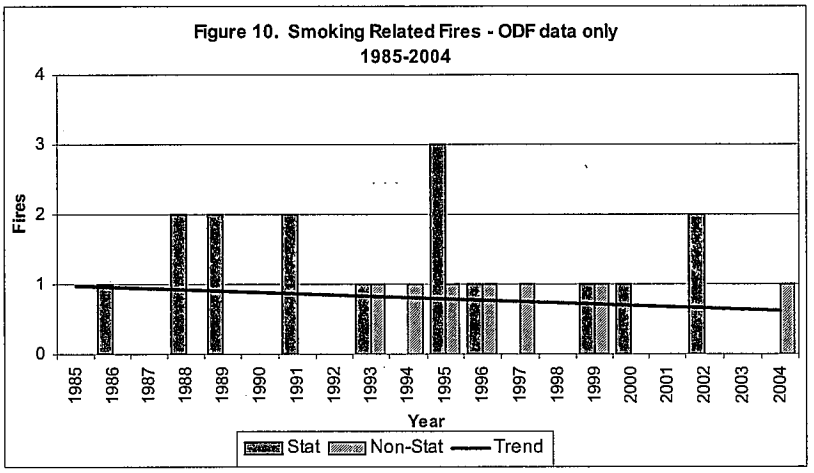


The frequency of **lightning** and related fire starts in northeast Oregon is higher than on the west side. Some of the largest fires in the county have been started by lightning during dry years. While lightning fires cannot be prevented, they can be kept small by quick-acting suppression resources. These fires tend to be clustered around storm events.

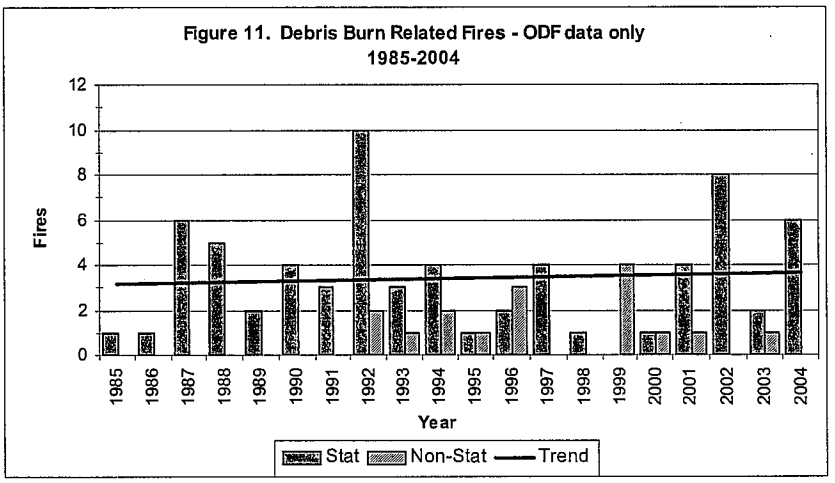




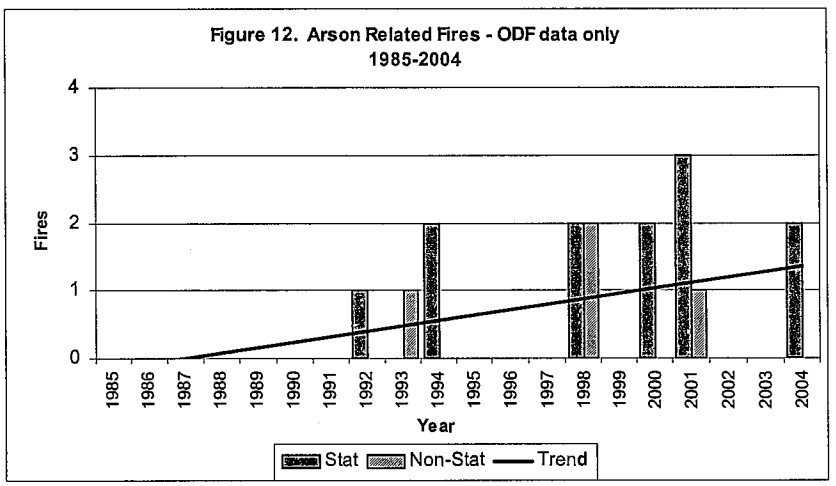




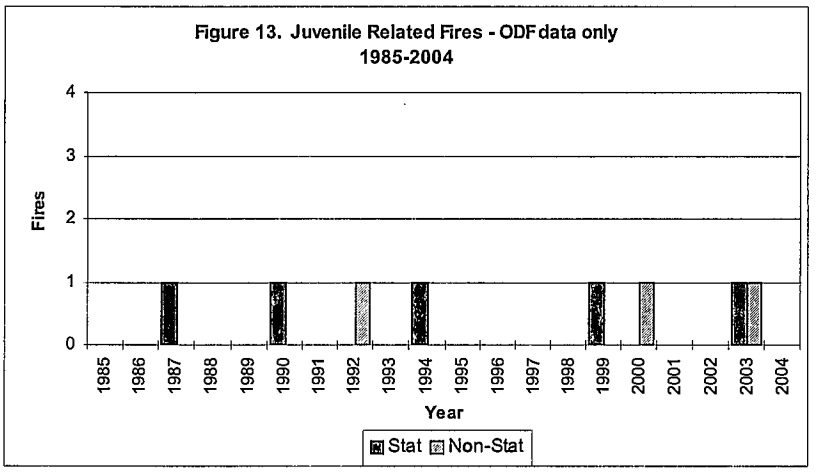
The trend in wildland fires caused by **smoking** and improperly discarded cigarettes is moving downward. It is unclear if this is due to fewer people smoking, better investigation of fire cause, or a combination of the two.



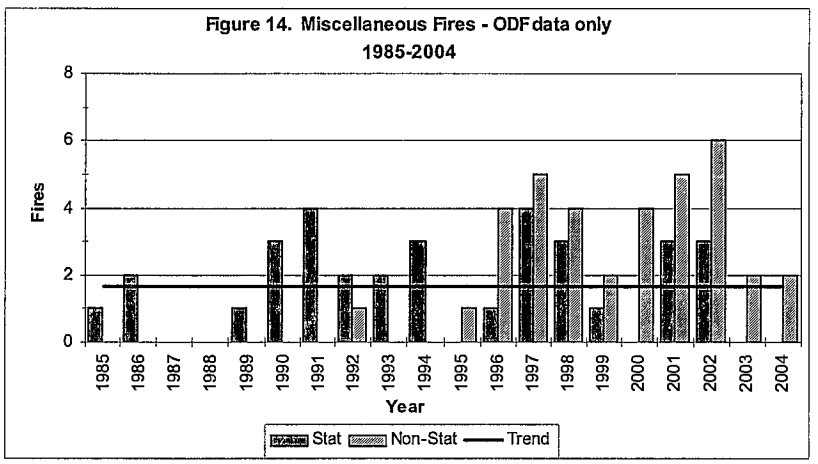
Historically, fires resulting from **debris burning** activities have resulted in at least 10% or more of the total number of statistical fire starts in the county over the last few decades. Unfortunately, even though these fires are preventable, there has been an increase in the last 5-year period even with the increased local burning bans during the fire season.



While the overall number across Oregon is decreasing, **arson** related fires seem to be trending upwards over the last few years in Umatilla County.



Juveniles starting wildfires has been sporadic. There have only been three fire starts in the last 5-year period. The education and prevention efforts in school classrooms (such as Smokey Bear) appear to be having an effect.



Miscellaneous fire cause is a catchall classification for fires resulting from a wide array of causes. Automobile accidents, burning homes and electric fence use are but a few of the causes. The overall trend of such fires has stayed constant

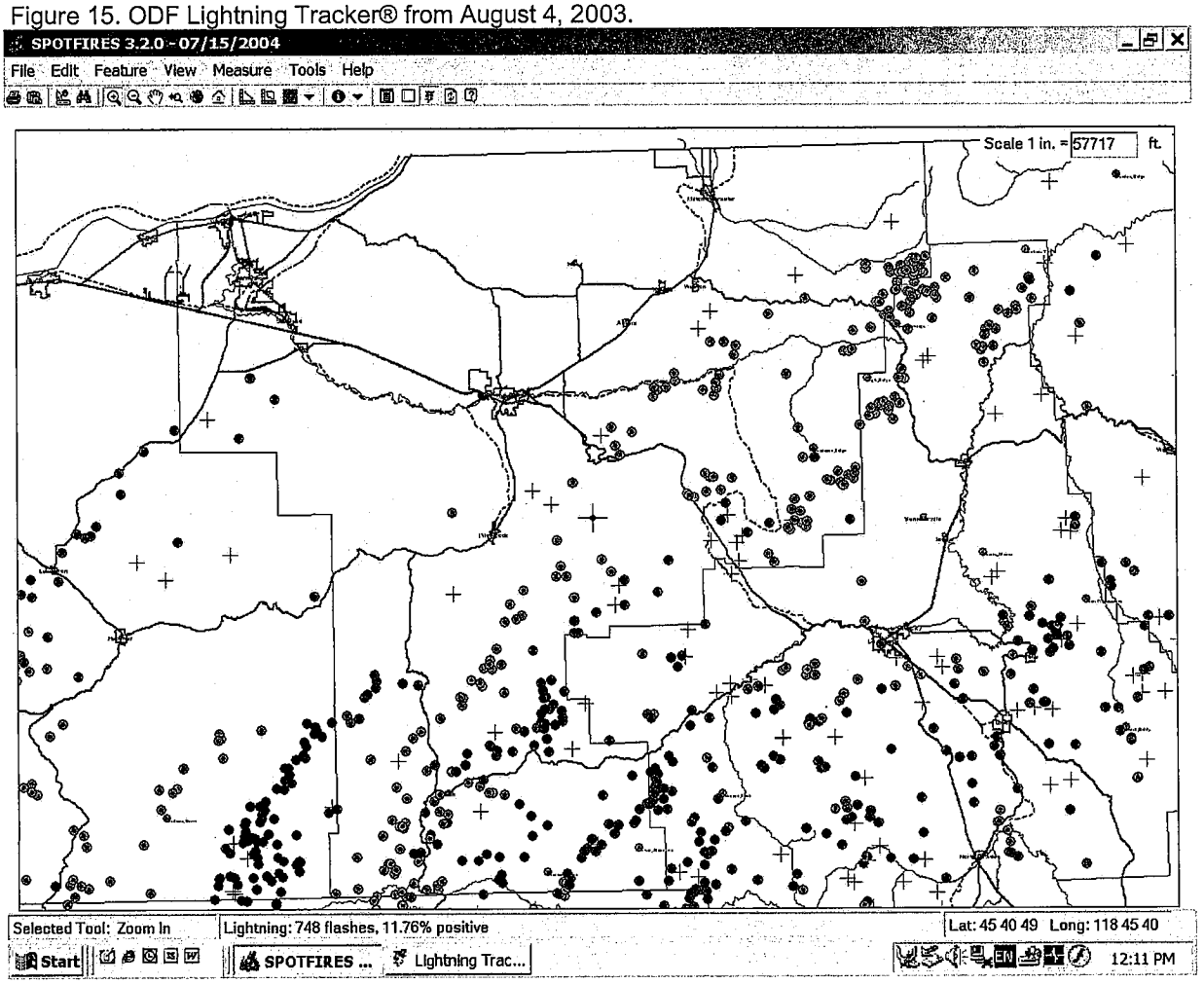
Fire Prevention & Detection

All wildfire protection agencies utilize similar tools to reduce the risk of a large wildfire event. These include prevention, detection, and the prompt suppression of known fire starts. All the agencies in the county work collaboratively as much as possible in all areas of fire protection.

While lightning fires can be potentially kept to a small size, they can't be prevented from actually starting. **Prevention** is a key component in reducing the number of human caused fires. All fire protection agencies rely on a prevention program that emphasizes education. Human caused fires often occur near populated areas or areas easily accessed by road. They are also seasonal and may occur during periods of high visitor use such as holidays or hunting seasons.

Fire **detection** for the Umatilla National Forest and associated private lands is primarily done through seven lookouts that are staffed throughout the fire season. During periods of high fire risk, an aerial fire detection aircraft may fly for wildland fire protection agencies. The aerial observation aircraft is also used in locating fire starts more efficiently, especially following heavy lightning activity. Pendleton Interagency Coordination Center (PICC) utilizes BLM's lightning detection program as well as ODF's GIS based software called Lightning Tracker®. These programs record in real-time, all down-strikes associated with a lightning storm. This information can then be mapped along with topographic and ortho maps and can be provided to firefighters to help locate potential fire starts. An example of the ODF software is shown in Figure 15 below.

Figure 15. ODF Lightning Tracker® from August 4, 2003.



Fire **suppression** resources are often rapid and utilize fire fighters, engines, and aircraft from the local area and neighboring agencies and Forests. Agencies also utilize private landowners and their available equipment such as dozers and water

tenders when additional resources are required. Agreements or contracts are made with both state and federal agencies, but can be used through the mutual aid and supplemental agreements already in place. USFS and ODF suppression forces are dispatched through PICC, while the Bureau of Indian Affairs (BIA) and CTUIR resources utilize CTUIR Police Department dispatch for suppression response notification.

The efforts of the combined fire suppression resources in Umatilla County have been very effective in suppressing wildfire in the CWPP area. On average, 96% of the fires are suppressed at 10 acres or less. Unfortunately, the remaining 4% of the fires tend to be damaging and very difficult to suppress.

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[6] State of Oregon Emergency Management Plan, *Natural Hazards Mitigation Plan, Fire Chapter*, November 2003.

7. Wildfire Risk Assessment[7]

To identify and prioritize wildland-urban interface areas-at-risk in Umatilla County, an assessment of factors was conducted; these factors contribute to large wildfire events that can leave communities vulnerable. This section will outline the process used and highlight unfamiliar definitions. Two key guidance documents were referenced in the assessment of communities-at-risk and the wildland-urban interface areas, as instructed by the State of Oregon:

1. *Field Guidance: Identifying and Prioritizing Communities at Risk.* National Association of State Foresters. June 27, 2003. (Available at: http://www.stateforesters.org/reports)
2. *Concept for Identifying and Assessment of Communities at Risk in Oregon.* Draft prepared by Jim Wolf, Fire Behavior Analyst, Oregon Department of Forestry. July 19, 2004. (Available at: jwolf@odf.state.or.us)

In Umatilla County, a ***community-at-risk (CAR)*** is defined as a group of homes or other structures with basic infrastructure (such as shared transportation routes) and services within or near federal land. A ***wildland-urban interface (WUI)*** area surrounds a community-at-risk, including that community's infrastructure or water source, and may extend 1 ½ miles or more beyond that community. This boundary depends on topography and geographic features that could influence the when creating an effective firebreak, or Condition Class 3 lands.

It is important to understand the meaning of risk and hazard in relation to wildfire. ***Risk*** is the chance or probability of occurrence of fire. ***Hazard*** is the exposure to risk; in a wildfire situation, those hazards can be related to either the natural or the man-made environment. Natural hazards include fuel type and amount of fuels, topography, and weather. Man-made hazards include the availability of water, access to structures, having limited greenspace around structures, and the ignitability of structures. The capability of firefighting resources will be compromised by the severity of both natural and man-made hazards.

Fire Occurrence/Risk of Ignition

The rate of fire occurrence is an important component of the assessment. Historical fire records were used for the last ten years (1994-2003). Fire history data was compiled from the Umatilla National Forest, Oregon Department of Forestry Pendleton Unit, and the BLM. Data from tribal and BIA agencies, and city, rural and volunteer fire departments was not available in GIS format at the time of this plan.

The fire occurrence rate (FOR) per 1,000 acres was used to yield a statistical analysis of the project area. The number of fires for the past ten years for Umatilla County was determined in order to calculate fire occurrence per 1,000 acres. This resulted in an overall county fire occurrence rate. Using this factor, a fire occurrence

rate for each identified WUI was calculated. The majority of the WUI areas had a fire occurrence rate higher than the overall fire occurrence rate for the county.

Fuels / Vegetation

Data used to create a fuels inventory in GIS was derived from Landsat imagery provided by Oregon Department of Forestry for private lands and the Umatilla National Forest GIS Library (UM Veg01 from the USFS vegetation inventory data, a combination of aerial photo interpretation and a stand exam stocking survey from 2001). For Umatilla County, the increased risk of a large wildfire event is caused by the buildup of forest fuels and changes in vegetation composition over time. Dense timber stands compete for limited water and nutrients and are at increased risk of wildfire, and from insect and disease epidemics.

Fire Regime Condition Class Definition[8, 9, 10]

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse-scale definitions for natural (historical) fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). There are five natural (historical) **fire regime** groups adapted for all lands managed by the federal agencies. They are based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. These five regimes include:

> I – 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced); located primarily in low-elevation forests of pine, oak, and pinyon-juniper.
>
> II – 0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced); located primarily in low- to mid-elevation rangeland, grassland, or shrubland (a lot of the rolling foothills land).
>
> III – 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced); located primarily in forests of mixed conifer, dry Douglas fir, or wet ponderosa pine.
>
> IV – 35-100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced).
>
> V – 200+ year frequency and high (stand replacement) severity.

A combination of activities may have contributed to this departure from the historic condition class of a fire regime: federal fire exclusion policy, timber harvesting, livestock grazing, introduction and establishment of non-native (exotic) plant species, introduced or native insects and disease, or other past management activities.

A **fire regime condition class** (FRCC) is a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). Coarse-scale FRCC classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2001) (FRCC). They include three condition classes for each fire regime. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g. insect and diseased mortality, grazing, and drought). There are no wildland vegetation, fuel conditions, or wildland fire situations that do not fit within one of the three classes.

The three classes are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the natural (historical) regime (Hann and Bunnell 2001, Hardy et al. 2001, Schmidt et al. 2002). The central tendency is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside.

Characteristic vegetation and fuel conditions are considered to be those that occurred within the natural (historical) fire regime. Uncharacteristic conditions are those that did not occur within the natural (historical) fire regime. These include invasive species (e.g. weeds, insects, and diseases), "high graded" forest composition and structure (e.g. large trees removed in a frequent surface fire regime), or repeated annual grazing that maintains grassy fuels across relatively large areas at levels that will not carry a surface fire. Determination of amount of departure is based on comparison of a composite measure of fire regime attributes (vegetation characteristics; fuel composition; fire frequency, severity and pattern) to the central tendency of the natural (historical) fire regime. The amount of departure is then classified to determine the fire regime condition class. A simplified description of the fire regime condition classes and associated potential risks follow in Table 3.

Across Umatilla County, condition class 2 and 3 are more dominant. Fire regimes altered from their historic range, set up the eastern and southern parts of the county (Blue Mountains region) for wildfires to be larger in scale, more intense in severity, and significantly changed landscape patterns. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, introduced insects and disease, or other pest management activities.

Table 3. FRCC Description and Associated Potential Risks

Fire Regime Condition Class	Description	Potential Risks
Condition Class 1	Within the natural (historical) range of variability of vegetation characteristics; fuel composition, fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuels characteristics. Composition and structure of vegetation and fuels are similar to the natural (historical) regime. Risk of loss of key ecosystem components (e.g. native species, large trees, and soil) is low.
Condition Class 2	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe). Composition and structure of vegetation and fuel are moderately altered. Risk of loss of key ecosystem components is moderate.
Condition Class 3	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects, and other associated disturbances are highly departed (more or less severe). Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components is high.

A **total vegetation hazard** was created by considering both the crown and the surface fuels hazards. Surface fuels hazard was determined by using fire behavior fuel models and/or potential flame length (for ground and ladder components). Fuel Models are descriptions of the fuel types that are used in surface fire behavior modeling and the Fire Behavior Prediction System (FBPS). Values were assigned for each fuel group and Table 4 below displays the grouping of fuel models to determine hazard:

Surface Fuels	*Value*
Group 1	1
Group 2	3
Group 3	5

Table 4. Fuel Models Used to Determine Hazards

Fuel Hazard Factor	Fuel Types	Fire Characteristics
1	Grass, Low/less Flammable brush, and short-needle timber litter (FM 1, 5, 8)	Typically produces a flame length of up to 5 feet; a wildfire that exhibits very little spotting, torching, or crowning, and which results in a burned area that can normally be entered within 15 minutes. Low severity.
2	Grass/Timber, Moderate brush, conifer reproduction, open sage and juniper (FM 2, 6, 9)	Typically produces a flame length of 5-8 feet; a wildfire that exhibits sporadic spotting, torching, or crowning, and which results in a burned area that can normally be entered within one hour. Mixed severity.
3	Tall, flammable grasses, Heavy/flammable brush, timber/slash (FM 3, 4, 10-13)	Typically produces a flame length of over 8 feet; a wildfire that exhibits frequent spotting, torching, or crowning, and which results in a burned area that normally cannot be entered into for over one hour. Stand replacement severity.

Crown fuels hazard was derived from the vegetation conditions of the landscape considered the canopy closure and structure [ODF's crown of closure; USFS' crown density; species and size].

Crown Fuel Group	*Value*
Low	1
Moderate	3
High	5

Total vegetation hazard was determined by combining the points assigned to the crown fuels hazard and the points assigned to the surface fuels hazard. The total possible value for the vegetation hazard is ten and an adjective rating was assigned to the point breaks (Historical notes have been kept for the GIS processes used and archived at the Oregon Department of Forestry Northeast Oregon District office in La Grande, Oregon):

Adjective	*Value*
Low	1 to 4
Moderate	5 to 7
High	8 to 10

A layout displaying the total vegetation hazard for Umatilla County can be found in Appendix B. (For more detailed description of each fuel model, a copy of USDA Forest Service publication "Aids to Determining Fuel Models for Eliminating Fire Behavior" (Anderson, 1982) is available through the Umatilla National Forest.)

Topographic Hazard

Slope and aspect affect both the intensity and rate of spread of a wildfire. The topography factor was derived from the Digital Elevation Model for Umatilla County. The following values were assigned to the combination of slope and aspect working together on the landscape:

Slope	*Value*
0 – 25%	1
25 – 50%	2
> 50%	3

Aspect	*Value*
N, NE	1
NW, E	2
W, SE	3
S, SW, Flat	4

Total topographic hazard was determined by combining the points assigned to both slope and aspect hazards, with a maximum of seven points possible. A layout displaying the total topographic hazard for Umatilla County can be found in Appendix B.

Overall Natural Hazard

The total topographic hazard rating and the total fuels hazard rating were combined using *Spatial Analyst* (an ESRI product) to determine overall natural hazard of the Blue Mountains region of Umatilla County. The maximum points assigned for total topographic hazard was seven and the maximum points assigned for total vegetation hazard was 10. The breakpoint used to determine high hazard or low/moderate hazard was 10; anything that scored 10 points or more was considered high hazard, and anything below 10 was considered moderate or low hazard (there was no delineation between low and moderate). (Refer to Appendix B)

Weather Hazard

In Umatilla County, weather patterns can produce summer lightning storms that start many fires. These multiple starts can put a strain on the wildland firefighting resources spread across the county. With the drying of fuels over time and the low relative humidity factored in, the probability for large fires can significantly increase during these lightning events. The number of days per season that forest fuels are capable of producing a significant fire event is also important to consider. Oregon Department of Forestry has already determined that eastern Oregon is at the highest hazard rating for weather. This value was assigned through an analysis of daily wildfire danger rating indices in each regulated use area of the state. This assigned value is constant across Umatilla County. However, since weather patterns vary due to the mountainous landscape of the project area, the high hazard value was offset with annual rainfall levels as part of the scoring process. This helped to prioritize the WUI areas as well as reflecting a more realistic assessment of weather hazard.

Annual Rainfall	*Value*
< 12 inches	1
13 – 24 inches	2
> 25 inches	3

Overall Fire Protection Capability Hazards (Structural Vulnerability)

For Umatilla County, it was decided that the local fire departments would determine for themselves what they thought their overall capability was for responding to a fire in their district. Each district was provided with a written questionnaire and asked to submit information about roads that prohibit access to structures, water shortages, unprotected locations, structure density, building materials, defensible space around structures, and any other issue(s) that might pose a hazard to their fire district. That information is being digitized using GIS and will be available in the next update of the plan.

Homesite Assessment

A separate project being conducted by ODF involves the assessment of all homesites within the ODF protection boundary (both year-round residential and recreational cabins). This work has been funded to date using NFP dollars; a proposal for Umatilla County Title III dollars to finish the work is pending. To date, there have been over 900 homes assessed and inventoried by ODF staff within the Pendleton Unit. There is an estimated 300-500 left to review, mostly in the Tollgate and Weston Mountain area.

ODF has attempted to locate all known homesite structures in the interface areas by utilizing county assessment information. When possible, ODF has explained to property owners the purpose of the assessment and has provided information to those interested, on how to create and improve defensible space around a structure. A geospatial positioning unit (GPS) was used to obtain location information (latitude/longitude). Some of the other information collected includes:

- Addressing & Roadway Access
  - Visible and readable address
  - Accessible to fire equipment
  - Adequate turnouts
  - Alternate escape route
- Firebreak or Greenbelt
  - Flammable vegetation removed
  - Ladder fuels removed
  - Roof free of limbs and debris
  - Degree of adjacent fuels
- Building Characteristics
  - Non-combustible roof and siding materials
  - Decks enclosed or screened
- Miscellaneous

- Vegetation around power lines cleared
- Location of gas/diesel/propane tanks
- Vegetation cleared around fuel tanks
- Additional water sources available

Using the assessment checklist, a classification was attributed to each homesite and entered into the database as "Livable Structure Value". Structure Value is defined by roof type and siding type and is used as a general estimate of the survivability of the property since the survivability cannot be guaranteed.

Green: Non-Combustible Roof/Non-Combustible Siding (with help from firefighters, the structure is **likely to survive** a wildfire).

Yellow: Non-Combustible Roof/Combustible Siding or Combustible Roof/Non-Combustible Siding (with help from firefighters, the structure **may survive** a wildfire).

Red: Combustible Roof/Combustible Siding (even with help from firefighters, the structure **may not survive** a wildfire).

A general breakdown of the 970 properties reviewed to date and put into the ODF database includes:

- 9% are classified as Green, 7% are classified as Red, and 84% are Yellow
- Of the properties reviewed, 42% had Good access to the structure (ingress/egress) while the rest where either Fair or Poor
- 72% have some level of Defensible Space
- 24% have Light Adjacent Fuels – considered grasses and forbs
- 36% have Medium Adjacent Fuels - include short, light brush and small trees
- 39% have Heavy Adjacent Fuels – include tall, dense brush, timber, and hardwoods
- Less than 1% have Slash Fuels adjacent to the structure – logs, chunks, bark, branches, stumps, and broken understory trees and brush
- 35% of the properties have some type of containerized fuel tank (gas/diesel/propane)
- 22% of the properties have no apparent domestic water source available

Home Construction Materials

A wildland fire incident could generate radiant heat, sparks, and embers over a prolonged period, subjecting the outside of a home to fire ignition prior to any type of safe fire suppression activity at the home. Studies completed by the Missoula Fire Lab have shown that most structures lost due to wildfire are the result of radiant heat, sparks, and embers igniting flammable materials in direct contact with the building. After the fire front has passed, creeping and residual fires are typically all that are present, and these types of fires rarely burn down structures.

The two most common places for sparks or embers to ignite a home are the roof and exposed decks. New fire resistant building materials and treatments are available to homeowners and contractors. Manufacturers have designed these materials to replicate traditional building materials, but they reduce the ability of sparks and embers to ignite the building.

The following was taken from the Umatilla County Development Code GF Grazing/Farm Zone §152-080: This zone is designed to protect grazing lands, forest uses, and inclusions of agricultural land that are found within the county's mixed use farm/forest areas.

§152-084(B) (3) (g) The dwelling must meet the following fire siting and fire safety design standards:

1. Shall have a fire retardant roof;

2. Will not be sited on a slope greater than 40%;

3. If the dwelling has a chimney or chimneys, each chimney shall have a spark arrester;

4. Dwelling is located upon a parcel within a fire protection district or is provided with residential fire protection by contract;

5. If the dwelling is not within a fire protection district, the applicant provides evidence that the applicant has asked to be included in the nearest such district;

6. If the county determines that meeting the requirement of division (B) (3) (g) 4. above is impractical, the county may provide an alternative means for protecting the dwelling from fire hazards. Such means selected may include a fire sprinkling system, on-site equipment and water storage or other methods that are reasonable, given the conditions. If a water supply is required under this division, it shall be a swimming pool, pond, lake or similar body of water that at all times contains at least 4,000 gallons or a stream that has a minimum flow of at least one cubic foot per second.

7. Owner(s) provide and maintain a primary fuel-free break area surrounding all structures and clear and maintain a secondary fuel-free break area in accordance with the provisions in "Recommended Fire Siting Standards for Dwellings and Structures" dated March 1, 1991 published by the Oregon Department of Forestry.

8. Road access shall be provided to within 15 feet of the water's edge for fire-fighting equipment and pumping units.

9. Road access shall accommodate the turnaround of firefighting equipment during the fire season.

10. Permanent signs shall be posted along the access route to indicate the location of the emergency water source.

11. Road design standards shall meet the appropriate rural fire protection district and forest protection district standards for private roads and bridges, except for private roads and bridges accessing only commercial forest uses. If no such standards exist, the county shall, on a site by site basis, consult with the appropriate fire or forest protection district to determine mutually agreed upon road and access standards considering maximum grade, road width, turning radius, road surface, bridge design, culverts, and road access taking into consideration seasonal weather conditions.

Insurance Services Office Fire Hazard Rating

The Insurance Services Office (ISO) is an independent, advisory organization that serves insurance companies, fire departments, and others by providing information about risk, including public fire protection. They help establish appropriate fire insurance premiums for residential and commercial properties by providing the insurance industry with up-to-date information about a community's fire protection capabilities.

ISO uses the Fire Suppression Rating Schedule (FSRS) to review and evaluate the fire fighting capabilities of communities across the country. The rating schedule measures the major elements of a fire suppression system and develops a numerical grade called the Public Protection Classification (PPC™). A number from 1 to 10 is assigned - Class 1 represents exemplary public protection and Class 10 indicates that the area's fire suppression program does not meet minimum criteria.

The PPC depends on:

- Receiving and Handling Fire Alarms (10%) – reviews the fire alarm and communications systems including telephone systems, telephone lines, staffing levels, and dispatch systems.

- Fire Department (50%) – reviews the fire protection company including the staffing, training, equipment, and the geographic distribution of the fire companies.

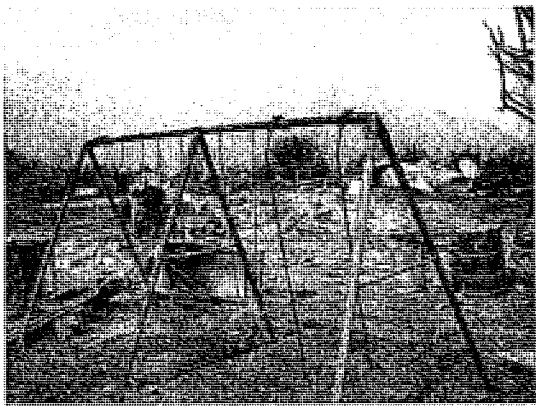
- Water Supply (40%) – reviews the water supply system that is available for fire suppression in the community including condition and maintenance of hydrants, and an evaluation of the amount of available water compared with the amount needed to suppress fires. (Per Don, as part of the fire protection classification, these are always combined for structural protection.)

Communities are evaluated based on nationally recognized standards developed by the National Fire Protection Association and the American Water Works Association. The PPC rating can provide a benchmark for fire departments and local officials in measuring the effectiveness of their fire protection services and is an additional tool for planning and budgeting efforts. Virtually all U.S. insurers of homes and business property use ISO's PPC in calculating premiums. In general, communities with superior fire protection services and good Public Protection Classifications have lower fire losses, and typically lower fire insurance premiums than communities whose fire services are not as comprehensive.

Values at-Risk

This category was based on public input collected during community meetings and from informational questionnaires. Steering committee members provided input based on their local experience and knowledge of the areas.

Values at-risk are an important, but highly subjective component of the assessment. Values lost because of a devastating wildfire would affect residents in different ways. Umatilla County's economy could be impacted if a large wildfire eliminated valuable timber, which might affect local businesses and industry. A fire could destroy recreational areas that draw tourists to the area. Tourism is becoming a large component of the county's economy. Social values-at-risk include home and property, animals, and cultural and historical sites. Reduced visibility can be an environmental concern and can reduce the scenic views, considered one of the great assets of rural Oregon. Comments from property owners identified the loss of scenic beauty and natural landscape as being of a high value. Numerous families maintain their primary residential property within the identified WUI areas across the county. Loss of human life and the loss of beloved domestic animals could be overwhelming for families. There are also hundreds of recreational cabins found in the forested lands, some of which have been used by multiple generations.



Ecologically, general wildlife habitat and diversity, as well as threatened and endangered species of fish, wildlife, and plant life could be wiped out or severely harmed in the long-term depending on the intensity of the wildfire. Water quality could be impacted if a moderate to high intensity wildfire burned through watersheds, affecting the health of fish and wildlife as well as domestic water supplies for residents. Umatilla County has good air quality compared with larger urban areas west of the Cascades; the smaller population and fewer large industrial emission sources generally mean fewer pollutants entering the air. However, pollutants from large scale or numerous smaller wildfires can affect residents already suffering from health concerns. The City of Pendleton is working with residents to reduce woodstove smoke. Umatilla County works with farmers and area fire districts/agencies to manage agricultural field burning smoke. The Forest Service

works with Oregon DEQ to ensure smoke from prescribed forest burns does not enter into populated areas. EPA works with several entities to monitor and reduce smoke impacts throughout the Pacific Northwest.

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[7] This section is based upon *Methodology for Hazard Assessment (2005authored by Angie Johnson, Oregon Department of Forestry Northeast Oregon District, and edited by Trish Wallace, USDA Wallowa-Whitman National Forest.*

[8] Protecting People and Sustaining Resources in Fire-Adapted Ecosystems – A Cohesive Strategy, October 13, 2000.

[9] Fire Regime Condition Class Definition. 06/20/2003. Obtained from Umatilla National Forest Fire Planning.

[10] Expanded Fire Condition Class Definition Table. Available at http://www.frcc.gov.

8. Mitigation Action Plan

Current Projects and Policies (i.e. ordinances, policies)

1. Unprotected Lands

In February 2005, the Oregon State Fire Marshall's Office, along with support from the Governor's Office, released a strategy for all counties to consider. The Umatilla County CWPP Steering Committee will recommend that the Umatilla County Commissioners officially adopt the following proposal:

Conflagration Response to Unprotected Areas

GOAL: Reduce interface fire incidents and related structural threat and loss.

PROPOSAL: The Governor will continue to consider Conflagration response to unprotected areas where the county has done the following:

2005 fire season

a) Demonstrated that the county is completing a fire protection plan (elements for NFP/Healthy Forests, FEMA mitigation, and where appropriate SB 360) Note: Counties can use Title III funds for this purpose.
b) Adopted DLCD Goal 4 to require minimum fire defense standards for new construction.
c) Changed property tax statement language for ODF assessment from "fire protection" to "ODF non-structural fire suppression" so homeowners and insurers are not led to believe they have structural fire protection.

2006 fire season

a) All of above
b) Demonstrated that the county is actively implementing a fire protection plan to strategically remove fuels.

By adopting this proposal and making it an official county ordinance/policy, the county retains the ability to request additional help in a large-scale wildfire event and enact the Conflagration Act.

The committee also recommends developing a long-term strategy to encourage and support efforts to bring all unprotected lands within Umatilla County under some type of formalized wildland fire protection coverage. This would involve ideas such as working with local government and rural fire districts to incorporate those unprotected areas into pre-existing fire protection boundaries or to enhance coverage through additional resources such as creating another substation in an existing district.

2. Grants – Current and Pending

In February 2005, ODF applied for PL 106-393 Title III funds ("Secure Rural Schools and Community Self-Determination Act of 2000") for two projects. Both projects were

recommended for funding by the local advisory group. The County Commissioners have passed the recommendations on to the regional level and are pending.

a. One proposal was for the 'Partners in Protection' program. This program will use components obtained through the state and federal excess property programs (ODF already has all the parts) to construct four slip-on pumper units. The portable pumpers are designed to slip onto a flatbed pickup. They would be available to interested landowners located in strategic points across the county. The program is intended to supplement the wildland suppression resources already available and provide additional equipment in high priority areas of the county. ODF staff will provide training to the landowners, as well as maintenance and off-season storage of the units. If funding allows, ODF intends on implementing this program during summer 2005.

b. The second was for funds to complete the Homesite Assessment project. This would finish the work previously funded using NFP dollars. ODF has worked on completing assessments of all homesites located within the wildland-urban interface areas within the ODF protection district of the Pendleton Unit. There are approximately 300-500 structures left to review, mostly in the Tollgate Mountain area. This information will then be added to the ODF database and into the project notebooks. Information collected includes structural vulnerability, ingress/egress, and presence of various risk factors. ODF anticipates completing this project by the end of 2005.

3. Senate Bill 360

In 2005, ODF hired an individual to work on the SB 360 program across the NEO District. Within the next 1-3 years, an assessment will be conducted on the wildland-interface areas of Umatilla County to determine if SB 360 should be implemented in that location. ODF will coordinate with County staff on its findings. Landowners will be notified about implementation efforts.

4. Education and Community Outreach

Education is an ongoing process. Multiple Firewise presentations have been made in the county within the last five years. The Living with Fire newspaper has been mailed and provided in various meetings to landowners. Smokey Bear continues to be an advocate for fire prevention measures and general forest health. ODF has used grants to place weekly and monthly notices from June-October over the last two years promoting wildfire safety awareness in local newspapers, including the Confederated Umatilla Journal (CUJ), the East Oregonian, and the Walla Walla Union-Bulletin. ODF also routinely runs Public Service Announcements (PSA's) and news releases throughout the year regarding wildfire awareness efforts.

Oregon Wildfire Awareness Week 2005 was held May 9-15th. This public awareness and fire prevention campaign typically precedes the normal fire season and is coordinated through the Oregon State Fire Marshall with many agencies participating. Governor Kulongoski signed a proclamation that made May 9th to May

15th "Wildfire Awareness Week" in Oregon. Many of the other western states have designated similar weeks during May. The Oregon proclamation was jointly requested by ODF, the Office of State Fire Marshall, Keep Oregon Green and the National Weather Service.

The Governor's proclamation read as follows:

WHEREAS: Wildfires increasingly threaten homes and communities; and

WHEREAS: The number, size and intensity of wildfires continues to challenge efforts to protect citizens, property and our natural resources; and

WHEREAS: Two-thirds of wildfires in Oregon are human caused, are therefore preventable, and a need exists to reduce the number of such fires through information and education; and

WHEREAS: Each year, more people move into Oregon and into wildland-urban areas and they need information, at the community and at the individual homeowner level, on how they can more effectively prevent fires and protect their property from wildfires; and

WHEREAS: Weather affects the potential for wildfire ignitions and subsequent fire behavior, making weather forecasting and observations critical to wildfire prevention success and to public and agency cooperation; and

WHEREAS: Local, state and federal firefighting agencies and the National Weather Service work together to prevent wildfires; and

WHEREAS: All Oregonians share in the responsibility for preventing wildfires and fire safe behavior must be practices by all who work and enjoy Oregon's forested areas.

NOW THEREFORE, I, Theodore R. Kulongoski, Governor of the State of Oregon, hereby proclaim May 9-5th, 2005 to be

WILDFIRE AWARENESS WEEK

In Oregon and encourage all Oregonians to join me in this observance.

In response to the Proclamation:

- The Fire Marshal's Office has developed a media toolkit, for use by agency personnel and others, to promote Wildfire Awareness Week;

- Wildfire Awareness Week will be highlighted on the front pages of the ODF and Keep Oregon Green websites and will be a part of the Governor's Drought and Fire Information website; and

- ODF and Keep Oregon Green will issue a different topical fire safety news release to media, each day during the week.

Most agencies now maintain websites that provide up-to-date information on fire conditions, public use restrictions, and regulated fire closures.

- Education opportunities at landowner group meetings and schools (includes Firewise, Living With Fire newspaper, Smokey Bear campaigns)
- Public use restrictions
- Regulated fire closure
- Burn permit program
- Railroad prevention program
- Evacuation plans needed to be reviewed
- As part of the Emergency Alert system
  - Consider a public outreach campaign to educate the wildland interface residents to tune into the weather station for emergency wildfire information
  - Put signs up along the major roadway informing people to "Tune to AM 1620 for Wildfire Information"
  - In case of an evacuation, the message could be sent out over the weather channel since these radios will now pick up the station with the addition of the tower. Look at grant money for making a bulk purchase of weather radios targeted at WUI residents

Visit the following websites for more information on different programs and look for links to other sites.

- **Umatilla National Forest**, Supervisor's Office
  (541) 278-3716
  http://www.fs.fed.us/r6/uma/

- **Oregon Department Of Forestry**
  (541) 276-3491
  http://www.odf.state.or.us/areas/eastern/northeast/

- **Umatilla County Emergency Management**
  (541) 966-3700
  www.co.umatilla.or.us/emergency_management.htm

- **CTUIR Fire Station**
  (541) 276-2126 daytime and (541) 278-0550 after hours

- **Area 9 Fire Defense Board**
  (Rural fire protection districts in Umatilla County)
  (541)567-8822

- **Office of State Fire Marshall**
  (503)373.1540
  www.sfm.state.or.us

5. Training Resources and Needs

Rural fire protection districts have a need for additional wildland fire equipment such as hoses, nozzles, portable pumps, and vehicles. The need for storage buildings for vehicles and equipment as well as additional substations on Weston Mountain continue to be discussed. Training for both paid staff and volunteers needs to be conducted on an annual basis. Acquiring additional funds for the rural fire districts, both the volunteer and tax-based departments, will be an ongoing item for assistance.

6. Mutual Aid Agreements

ODF has several mutual aid agreements currently in place. These agreements are reviewed annually by the participating agencies to maintain appropriate levels of protection across jurisdictions. Additional agreements will be written as needed to provide the most up-to-date collaboration among fire managers. ODF is currently working on creating and strengthening agreements with Washington Department of Natural Resources (WA-DNR) and the Walla Walla County Fire District #4 for protection services in the Mill Creek/Government Mountain WUI area.

7. Other Projects (to be identified)

Strategy for Risk & Fuels Reduction

Using the Hazard Assessment to Score and Prioritize WUI Areas

The Steering Committee identified communities-at-risk across the forested landscape using several factors. As previously defined, this could mean a group of homes or structures with basic infrastructure and services within or near federal land. The next step was to designate wildland-urban interface boundaries that would incorporate those communities-at-risk as appropriate by using assessment information (described more fully in the previous section). The hazard assessment information was used to develop a scoring matrix that would provide results that could be used for prioritizing the WUI areas within Umatilla County (see Table 5). The weighting of each element of the matrix was based on input received from the community, members of the steering committee, and information derived from the statewide assessment and scoring, and was not scientifically proven in any way. A statistician was not involved in the process, as this was meant to be community-driven, with input captured in its raw form by the community and the committee involved with its development. The list of priorities helped the committee build a comprehensive inventory of projects and action items that could be implemented to protect the WUI areas from large wildfire. A more complete explanation of each category is found in Appendix D. An aggregate score of 21 points was established as the overall high score.

Table 5. Scoring Matrix Factors Used for Ranking Umatilla County Wildland-Urban Interface Areas

Rating Factors for Communities-at-Risk	Point Breakdown
Likelihood of Fire Occurring (historical fire starts data from ODF and USFS; based on occurrence rate per 1,000 acres)	1 pt – low occurrence 2 pts – moderate occurrence 3 pts – high occurrence
Topographic Hazard (slope and aspect combined)	1 pt – 0% - 25% 3 pts – 25% - 40% 5 pts – more than 40%
Total Fuel Hazard (surface and ladder fuels combined)	1 pt – low hazard 3 pts – moderate hazard 5 pts – high hazard
Overall Fire Protection Capability (equipment, training, preparedness, access to homes, structure density, etc.)	1 pt – low capability 3 pts – moderate capability 5 pts – high capability
Weather Factor (high lightning hazard potential and low precipitation)	1 pt – low (~0-12" annually) 2 pts – moderate (~13-24" annually) 3 pts – high (~ 25+" annually)
Values at Risk (taken from surveys and public input; major infrastructure, municipal water source, utility lines/pipelines, etc.)	1 pt – present 0 pts – not present
	Total Points Possible = 21

While the risk of fire occurrence and topographic hazard would be hard to change in order to manipulate the scoring of a WUI, the total fuel hazard could be affected through fuels treatment projects and fire prevention campaigns. The overall fire protection capacity takes into account the capability of firefighting resources to respond and suppress a wildfire in the wildland-urban interface. It combines the type of fire protection training and equipment with structural vulnerability factors such as access to structures, ingress/egress, amount of defensible space, building materials used in structures, and available water sources. Local knowledge of firefighting agencies, structural and wildland, was utilized.

As a means to reflect the unique weather patterns found in the Blue Mountains region of Umatilla County, the steering committee used annual rainfall to offset the high hazard rating assigned across northeast Oregon area (for weather hazard. This category has a high point value of three. (Note: The layer used to determine annual rainfall came from the Oregon Department of Forestry GIS library).

Even though values at-risk is a subjective category, input provided by the public and members of the planning committee was considered during the assessment process and when scoring the WUI for values protected. Citizens of Umatilla County identified several common themes that were of high value to them, including their homes, the rural environment and scenic beauty in which they live, wildlife, timber, grazing, and various recreational opportunities. Municipal watersheds and major utility transmission lines and corridors were added since those values are part of the legislation that was put forth under the Healthy Forest Restoration Act (HFRA). The

score assigned was a value of one if values at-risk were noted in a particular WUI or zero for "no values at-risk present".

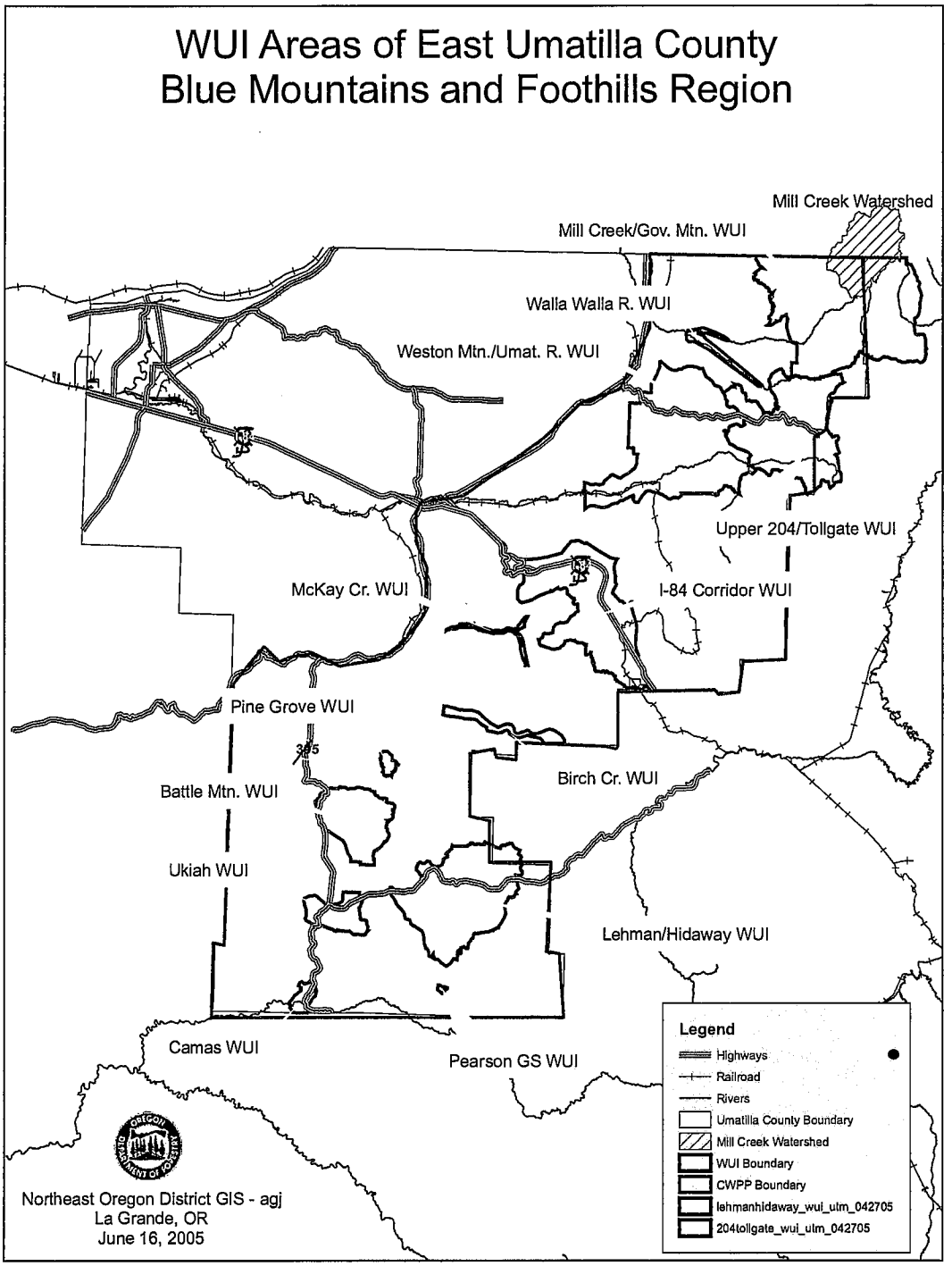
Prioritization

The WUI boundaries were drawn to capture the overall limitations of each fire protection district, fuel hazard, CAR's, and values-at-risk. Logical anchor points on the landscape were used to designate WUI boundaries, including natural fuel breaks, ridgelines, roads, and 6th field HUC boundaries (identified using the GIS layer available in the Oregon Department of Forestry GIS library). Other sections discuss additional public involvement in this planning process.

Thirteen WUI's were identified for the Blue Mountains region of the county. Based on the total points scored, each WUI was ranked as an area of High, Moderate, or Low Priority for the potential for projects and reducing the risk of wildfire hazards. Projects and Action Items for each WUI were developed based on the reasons that a WUI received a particular score in a particular category of the overall scoring matrix.

Table 6. Umatilla County Wildland-Urban Interface Areas – Listed by Total Score

Priority Level	WUI Name	Total Score
HIGH Priority (16-22 points)	I-84 Corridor	18
	Battle Mountain	17.5
	Lehman / Hidaway	17
	Weston Mountain / Umatilla River	16
	Mill Creek / Government Mountain	16
MODERATE Priority (10-15 points)	Upper 204 / Tollgate	15
	Pine Grove	15
	Camas	15
	Ukiah	13
	Birch	12
	Pearson Guard Station	12
	McKay	11
LOW Priority (<10 points)	Walla Walla River	9


WUI Areas of East Umatilla County
Blue Mountains and Foothills Region
Mill Creek Watershed
Mill Creek/Gov. Mtn. WUI
Walla Walla R. WUI
Weston Mtn./Umat. R. WUI
Upper 204/Tollgate WUI
McKay Cr. WUI
I-84 Corridor WUI
Pine Grove WUI
Birch Cr. WUI
Battle Mtn. WUI
Ukiah WUI
Lehman/Hidaway WUI
Camas WUI
Pearson GS WUI
Legend
Highways
Railroad
Rivers
Umatilla County Boundary
Mill Creek Watershed
WUI Boundary
CWPP Boundary
lehmanhidaway_wui_ulm_042705
204tollgate_wui_ulm_042705
Northeast Oregon District GIS - agj
La Grande, OR
June 16, 2005

The following sets of tables (#7-19) and WUI maps (Fig. 16-28) were designed to provide specific strategies for risk and fuels reduction projects for each designated WUI area in Umatilla County. The tables have been broken into three categories (education, treatment, and emergency response) and include timeframes and agencies involved in completing the tasks. These lists will be reviewed and updated as new projects and ideas are available.

Each map outlines a designated wildland-urban interface area (WUI) as identified by the Steering Committee. The wildland fire points (indicated by *on each map) are based on the combined ODF and USFS historical fire occurrence data for the period 1994-2003. (Note: The historical fire starts shown on the following maps represent ***wildland fires*** and not structural fires. They are a combination of both lightning-caused and human-caused fires.) As additional years of data become available, this hazard layer will be updated. Structure density is taken from data collected through ODF's Homesite Assessment project and inputted into the Spotfires database. (Note: some homesite points may be located in an incorrect location because of latitude/longitude errors. The database is being reviewed for errors, but at the time of this publication, that work was not yet completed. Additionally, the number of structures represented on the two WUIs covering Weston Mountain and the Tollgate area are incomplete. There are approximately 300-500 structures left to review, mostly in these two WUIs. ODF will be completing this project by the end of 2005.)

There are common themes repeated on the WUI planning sheets, including educational opportunities such as the FireWise workshops, general forest health and management activities, and treatment strategies along roadways to maintain noxious weeds and thick, flashy brush. Creating defensible space around structures and providing updated information Public Use Restrictions (including burn permit programs and the regulated closures for campfire, hunting, and use of power equipment) to both landowners and tourists are also ongoing activities for agencies. ODF's Partners in Protection (the pumper program designed to increase citizen response capability in strategically located areas across the county) will operate the same but be located only in certain areas. While the timing might vary from the north to the south ends of the county, information presented to the public will be consistent.

However, each WUI area should have identified education, treatment and emergency response items more specific to that area. Some items listed in the tables should be considered as 'possible' projects or strategies that may not be readily executed in the immediate future without additional funding or help from an involved community member.

Table 7. I-84 WUI Planning Sheet
WUI Name: I-84 Corridor **Priority Category:** HIGH

Description: Relatively flat corridor with radiating deep timbered canyons; major east-west interstate travel corridor; three major clusters of homesites as well as scattered homes along the freeway; major petroleum, natural gas, and BPA transmission lines; reverted CRP lands covered with heavy ponderosa pine reprod growth;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2.5	2.5	5	4	3	1	18

Education Projects	Timeframe	Lead Agency/Cooperators
• Implement Public Use Restrictions to address human-caused ignition(Meacham)	• Summer-fall	• ODF & CTUIR
• Promote ATV and motorcycle use awareness and information	• Ongoing	• ODF & CTUIR
• Review, monitor & enforce UPRR prevention plan	• Completed	• UPRR, ODF & USFS
• Develop cost-share options to create firebreaks on CRP acres (Poverty Flats)	• Ongoing	• ODF & NRCS
• Evaluate area for SB360 program & implement as appropriate	• 1-3 years	• ODF & County
• Participate in FireWise presentation or day-long community workshop	• By 2006	• ODF & County
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Review & evaluate fuels treatment projects along WUI boundaries for possible joint operations with USFS, BIA, and CTUIR	• Ongoing	• USFS, ODF & landowners
• Maintain travel corridor right-of-ways (noxious weeds and other fuels)	• Summer-fall ongoing	• ODOT, UPRR & County
• Encourage & support Oregon Parks fire prevention activities	• Ongoing	• Oregon State Parks
• Plan & complete fuels treatment including: roadways, commercial and non-commercial thinning	• Ongoing	• USFS, ODF & CTUIR
• Create defensible space around structures	• Ongoing	• ODF & CTUIR
• Maintain areas near utility transmission lines (weeds and brush)	• Ongoing	• Utility providers
Limitations: Funding for fuels treatment programs; inability to use National Fire Plan dollars on CRP ground;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Implement Partners in Protection program (Meacham/Poverty Flats area)	• Summer-fall ongoing	• ODF & landowners
• Work to enhance Meacham Volunteer Fire Department program capacity	• Ongoing	• Meacham FD, ODF, County & CTUIR
Limitations: Finding an interested landowner in a strategic location for pumper program;		

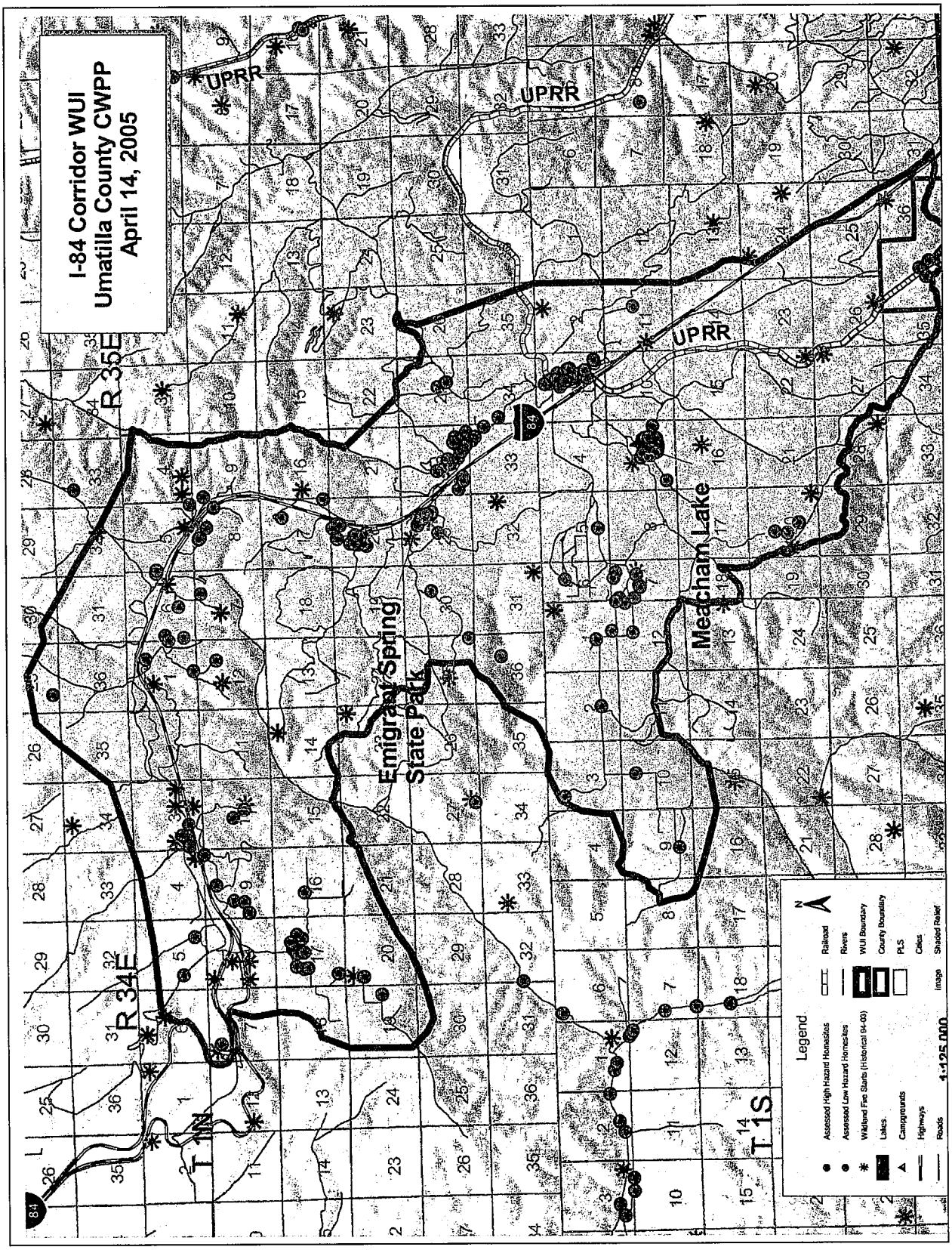


Figure 16. I-84 WUI Boundary with Density and Historical Wildland Fire Starts

Table 8. Battle Mountain WUI Planning Sheet

WUI Name: Battle Mountain **Priority Category:** HIGH

Description: Dry, ponderosa pine site with main state north-south highway passing through; two major clusters of homesites with additional scattered acreages throughout the area;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2.5	3	4	4	3	1	17.5

Education Projects	Timeframe	Lead Agency/Cooperators
• Complete house-to-house visits and promote defensible space to homeowners	• Ongoing	• ODF
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF & County
• Implement Public Use Restrictions to address human-caused ignitions (signs)	• Summer mos.	• USFS & ODF
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Review & evaluate fuels treatment projects to strategically locate near road systems, structures, & across WUI boundary lines with USFS & private landowners	• Ongoing	• USFS, ODF & landowners
• Monitor & complete USFS fuels treatment (Owens project)	• In process	• USFS
• Maintain travel corridor right-of-ways (weeds and brush)	• Ongoing	• ODOT & County
• Create defensible space around structures	• Ongoing	• ODF
• Maintain areas near utility transmission lines (weeds and brush)	• Ongoing	• Utility providers
• Encourage State Parks ladder fuels reduction treatment & other fuels reduction projects	• In process; west portion completed 2002	• Oregon State Parks
•	•	•
Limitations: Funding shortages for fuels treatment programs; biomass transportation costs;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Implement Partners in Protection program	• Ongoing	• ODF & landowners
• Encourage development of phone trees	• Ongoing	• Landowners, ODF, USFS & County
• Work to enhance the Ukiah Volunteer Fire Department capacity and response	• By 2007	• Ukiah Fire Dept., ODF, County & USFS
•	•	•
Limitations: Finding an interested landowner in strategic location for pumper program;		

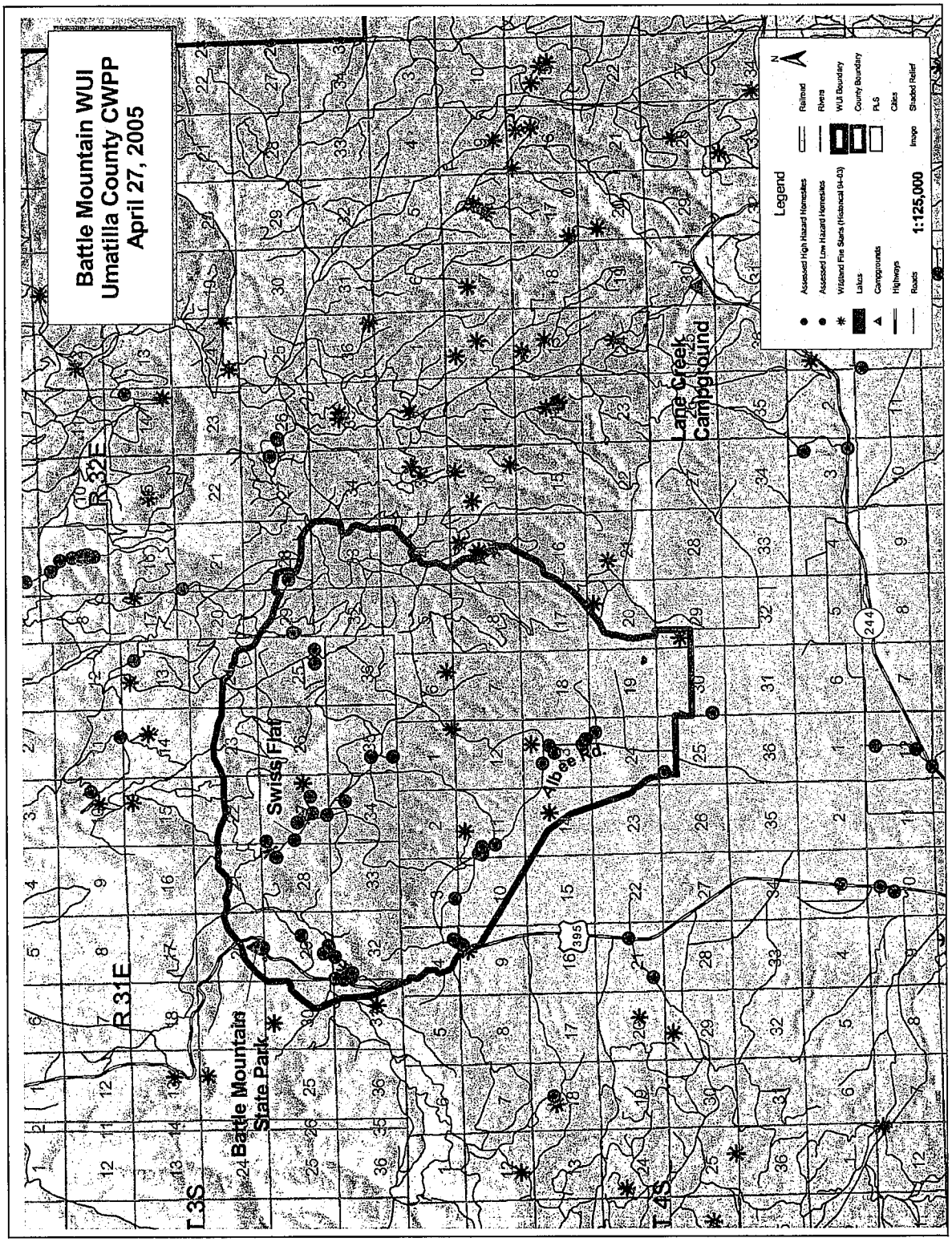


Figure 17. Battle Mountain WUI Boundary with Density and Historical Wildland Fire Starts

Table 9. Lehman / Hidaway WUI Planning Sheet

WUI Name: Lehman / Hidaway **Priority Category:** HIGH

Description: Destination resort area with three groupings of homesite concentrations; mixed conifer surrounded by federal forest service land;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	3	4	4	3	1	17

Education Projects	Timeframe	Lead Agency/Cooperators
• Target & provide prevention patrols around areas of high fire concern	• Summer mos.	• USFS & ODF
• Coordinate with resort operator regarding public use restrictions & fire prevention	• Ongoing	• USFS & ODF
• Promote ATV and motorcycle education & awareness with club members & the public	• Summer & fall	• ODF, USFS & local motorcycle clubs
• Implement Public Use Restrictions to address human-caused ignitions (signs)	• Summer - fall	• USFS & ODF
• Educate landowners on defensible space	• Ongoing	• ODF
Limitations: Funding for personnel in summer months; lots of non-residents traveling through area that aren't aware of local use restrictions;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Review & evaluate strategic fuels treatment projects along WUI boundaries in conjunction with USFS projects	• Ongoing	• USFS, ODF & landowners
• Maintain travel corridor right-of-ways (weeds and brush)	• Ongoing	• ODOT & USFS
• Monitor & complete mechanical fuels reduction projects including Weasel and Owens	• 1-3 years; Owens started as 2002 Demo	• USFS
• Complete underburning projects including Elk and Camas	• Started 2002	• USFS
• Create defensible space around structures	• Ongoing	• ODF
• Work with BLM on fuels treatment projects in Cable Creek area	• In progress	• BLM, USFS & ODF
Limitations: Funding issues for fuels treatment work including Owens and Weasel projects – ready for implementation, but no funds available for those two projects;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Work to enhance structural protection by annexing (or make agreement with) Ukiah Volunteer Fire Dept	• By 2007	• Ukiah Fire Dept., ODF & landowners
• Work on development of a community emergency plan	• 1-4 years	• Landowners
• Implement Partners in Protection program (Lehman)	• Ongoing	• ODF & landowners
Limitations: Increases in levels of public use; increasing number of human-caused fire starts;		

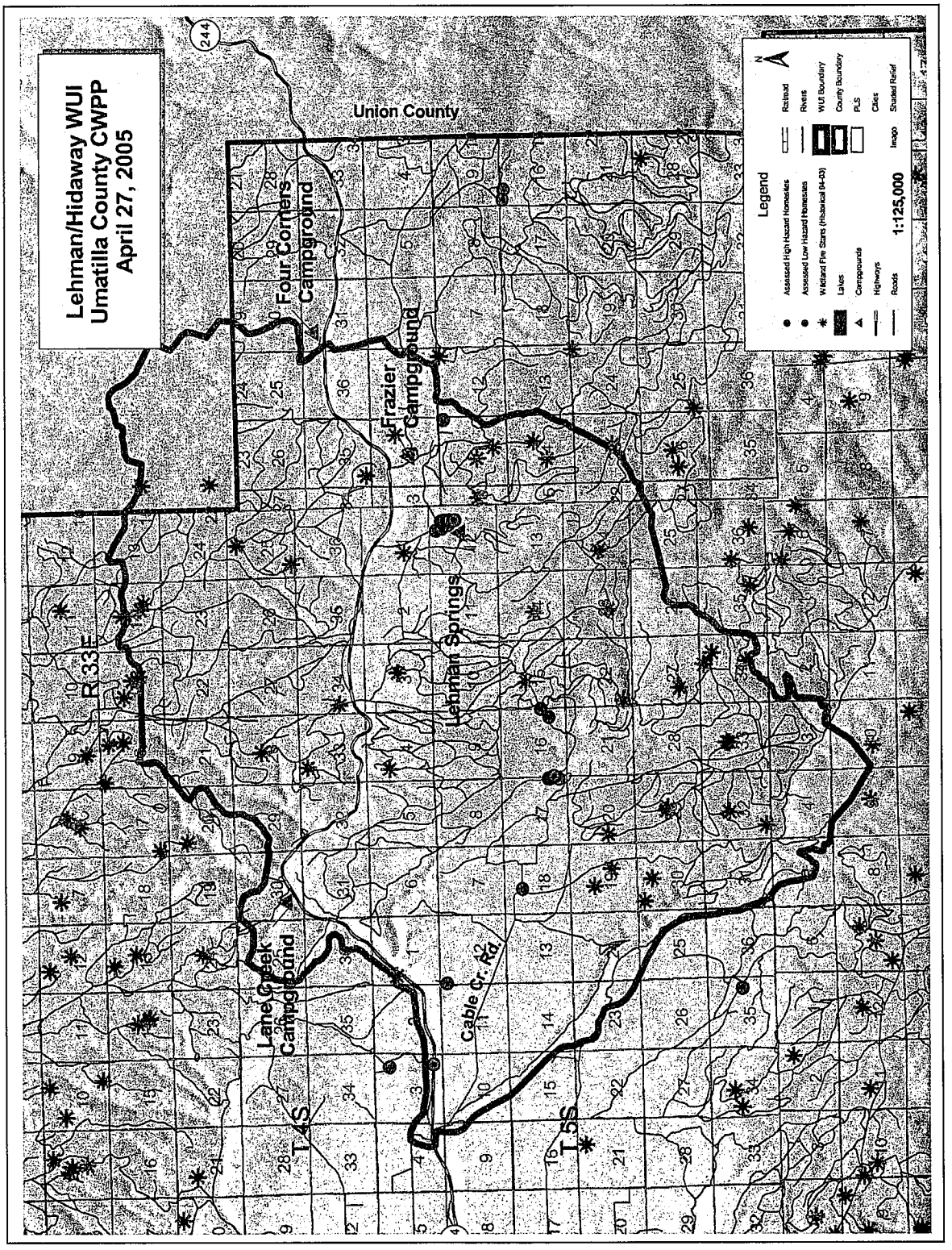


Figure 18. Lehman/Hidaway WUI Boundary with Density and Historical Wildland Fire Starts

Table 10. Weston Mountain / Umatilla River WUI Planning Sheet
WUI Name: Weston Mountain / Umatilla River **Priority Category:** HIGH

Description: Heavily rural homesite areas with numerous home and cabin sites scattered across area; fuel types include steep, grassy slopes and heavy timbered canyons with large areas of reverted CRP lands covered with heavy pine reprod; heavy recreation area with limited ingress/egress;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	3	4	4	2	1	16

Education Projects	Timeframe	Lead Agency/Cooperators
• Implement Public Use Restrictions to address human-caused ignitions	• Summer – fall	• USFS, ODF, EUCRFD & CTUIR
• Develop cost-share options to create firebreaks on CRP acres (Weston Mtn)	• Ongoing	• NRCS, ODF & landowners
• Promote safe debris burning activities	• Ongoing & year-round	• ODF, USFS, EUCRFD & CTUIR
• Target & provide prevention patrols in areas of high fire concern	• Summer mos.	• USFS, ODF & EUCRFD
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF & County
• Install & maintain information kiosk and more signing across area	• 1-2 years	• ODF, USFS & EUCRFD
• Participate in Fire Wise presentation or day-long community workshop	• By 2007	• ODF, EUCRFD & County
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Review & evaluate possible fuels treatment projects in conjunction with USFS, CTUIR, BIA & private landowners	• Ongoing	• ODF, USFS, EUCRFD & landowners
• Complete pre-commercial thinning	• Ongoing	• ODF & USFS
• Create defensible space around structures	• Ongoing	• ODF & EUCRFD
• Complete & monitor fuels reduction projects – Plenty Bob	• NEPA done; 3 yrs implement	• USFS
Limitations: issues with slope and access; ESA issues including Lynx analysis unit and bull trout in lower part; landowner interest in fuels treatment; funding for fuels reduction projects;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Work to improve fire fighting capacity (roads/access issues, more water sources, more equipment & fire fighters, etc)	• Ongoing	• ODF, EURFD & CTUIR
• Develop & strengthen communication & response plan among protection agencies	• Ongoing	• All
• Implement Partners in Protection program	• Ongoing	• ODF & landowners
• Look for & obtain funds to reopen High Ridge Lookout Tower in future (used as needed this year after 2-3 yrs of staffing)	• Ongoing	• USFS, ODF & CTUIR
Limitations: issues with slope and access to areas; funding to maintain full staff levels in strategically placed lookout towers that benefit all; funding for enhancing rural fire department capacities;		

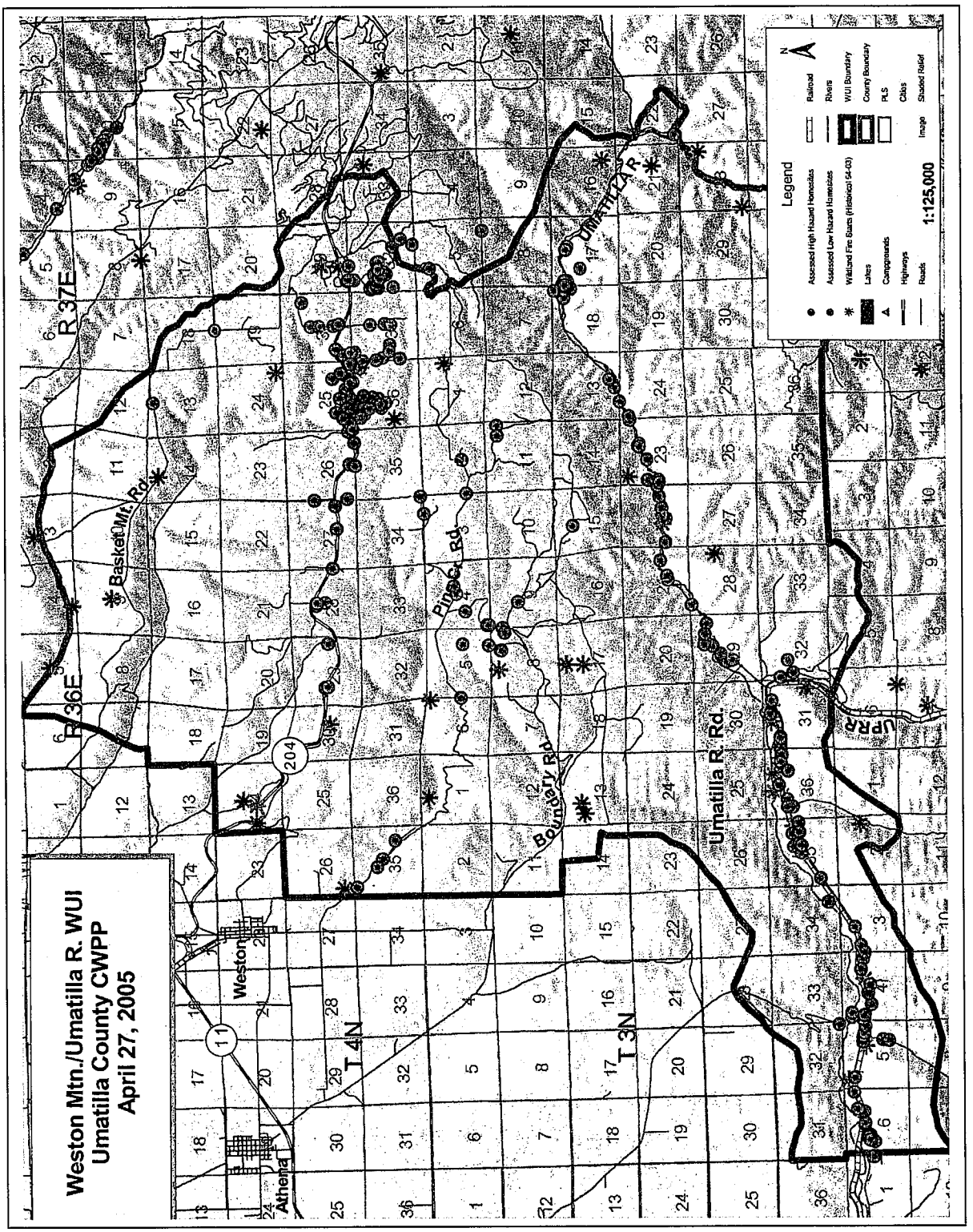


Figure 19. Weston Mtn/Umatilla River WUI Boundary with Density and Historical Wildland Fire Starts

Table 11. Mill Creek / Government Mountain WUI Planning Sheet
WUI Name: Mill Creek / Government Mountain **Priority Category:** HIGH

Description: North portion of WUI has north slopes heavily timbered with fir and spruce and south slopes with timbered stringers and open grass and brush ridges; steep slopes and dense, brushy vegetation; numerous year round and weekend homesites in canyon bottom; contains the municipal watershed for City of Walla Walla

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	3.5	3	4.5	2	1	16

Education Projects	Timeframe	Lead Agency/Cooperators
• Participate in Firewise presentation or day-long community workshop	• April 14, 2005	• WA-DNR, ODF, USFS & Walla Walla County Fire District #4
• Complete house-to-house prevention visits and promote defensible space	• Summer 2004 90% complete	• ODF
• Implement Public Use Restrictions to address human-caused ignitions (more signs)	•	•
• Promote safe debris burning activities	•	•
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF & County
• Install & maintain information kiosk	• Summer – fall annually	• WA-DNR, ODF, USFS & WWCFD #4
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Review & evaluate fuels reduction projects in conjunction with USFS & WA-DNR	• Coordinate w/ key landowners	• ODF, USFS & landowners
• Evaluate & maintain shaded fuel break: Tiger Saddle to Skyline	• 2004 completed	• USFS
• Complete fuels reduction (shaded fuel break) on WA-OR state line	• Coordinate w/ WA-DNR	• ODF
• Maintain travel corridors and cutbanks to minimize available fuels (weeds and brush)	• Coordinate w/ WA-DNR	• WA-DNR & Umatilla County
•	•	•
Limitations: Wilderness adjacent to closed, municipal watershed; extreme topography; ESA including Bull Trout & Lynx; outcome of USFS Wilderness Boundary Survey; landowner interest in fuels treatment; part-time residents; available funding for fuels treatment projects and staffing levels		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Maintain Skyline Rd for fire access	• Ongoing	• USFS
• Evaluate & maintain ingress/egress access on Yellow Jacket Ridge and Skyline Road	• Ongoing	• USFS
• Create and strengthen written agreements with Walla Walla Fire District #4 and WA-DNR	• Ongoing	• ODF
• Maintain funds for Table Rock Lookout staff	• Ongoing	• USFS & City of Walla Walla
• Maintain funds for patrol rider in Mill Ck WS	• Ongoing	• USFS & City of Walla Walla
• Develop other water sources for helicopter dip sites, portable heli-wells, other equipment	• Ongoing	• ODF & USFS
• Develop agreements with landowners to use available ponds as water sources	• Ongoing	• ODF & USFS
Limitations: Increases in levels of public use near wilderness areas; increasing human-caused fire starts; secure funding for alternative water sources;		

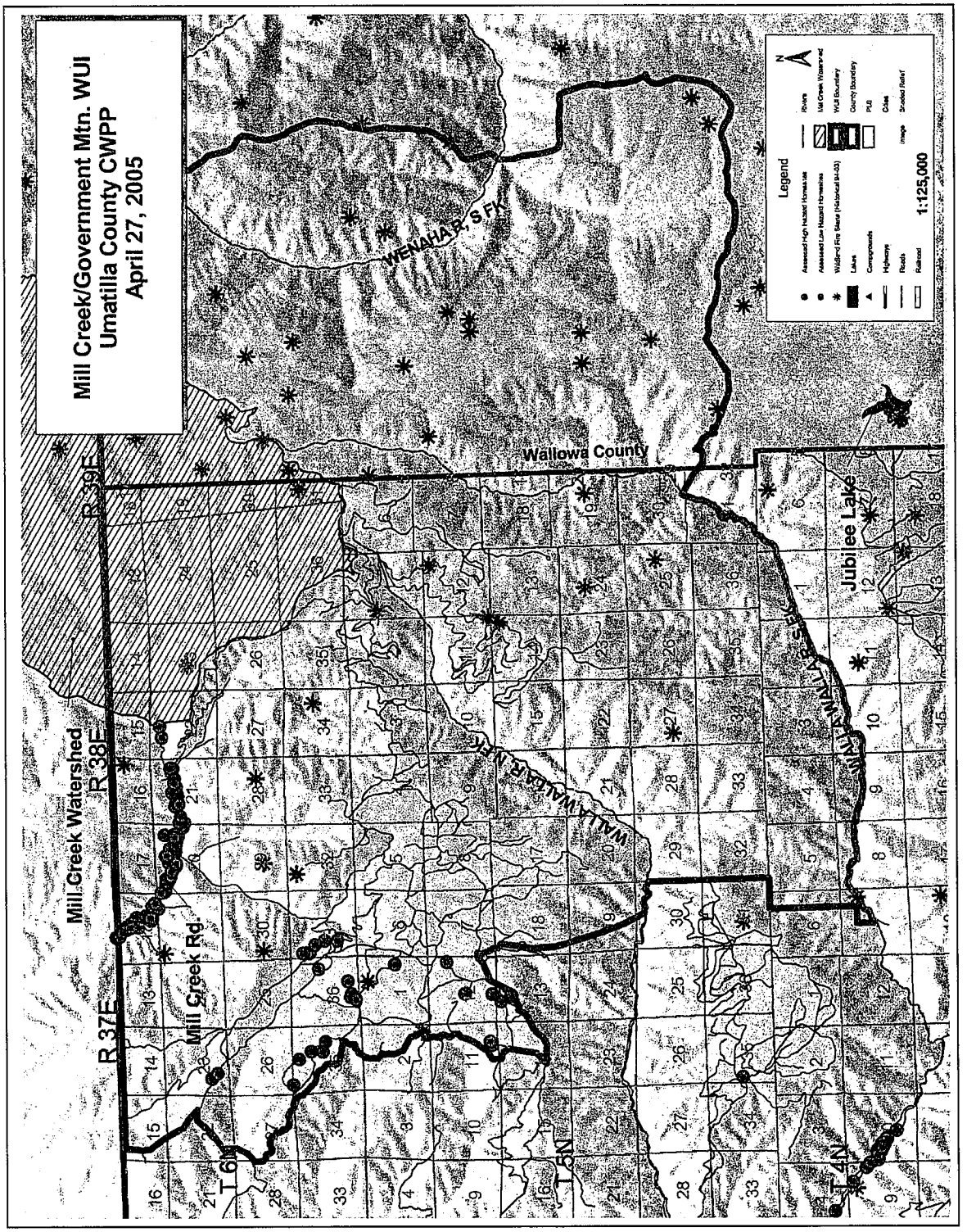


Figure 20. Mill Creek/Government Mtn WUI Boundary with Density and Historical Wildland Fire Starts

Table 12. Pine Grove WUI Planning Sheet
WUI Name: Pine Grove **Priority Category:** MODERATE

Description: Small year-round community of homes with residents along the canyon bottom; steep, grassy slopes with timbered stringers; one main road in and out of area;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
1	3	4	4	2	1	15

Education Projects	Timeframe	Lead Agency/Cooperators
• Implement Public Use Restrictions to address human-caused ignitions	• Summer – fall	• ODF, Pilot Rock RFD
• Target & provide prevention patrols in areas of high fire concern	• Summer - fall	• USFS & ODF
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF & County
•	•	•
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Evaluate & complete mechanical fuels treatment	• Ongoing	• USFS & ODF
• Evaluate & coordinate for joint project areas that could extend across boundaries such as "Gulch"	• Ongoing	• USFS, ODF & landowners
• Maintain road right-of-ways (weeds/brush)	• Ongoing	• County
• Create defensible space around structures	• Ongoing	• ODF & Pilot Rock RFD
•	•	•
Limitations: Funding for fuels reduction projects;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Implement Partners in Protection program	• Ongoing	• ODF & landowners
• Review ingress/egress issues & address changes as appropriate	• Ongoing	• ODF, landowners & County
• Work to enhance rural fire protection capacity	• Ongoing	• ODF & Pilot Rock RFD
•	•	•
Limitations: finding an interested landowner located in strategic location for pumper program;		

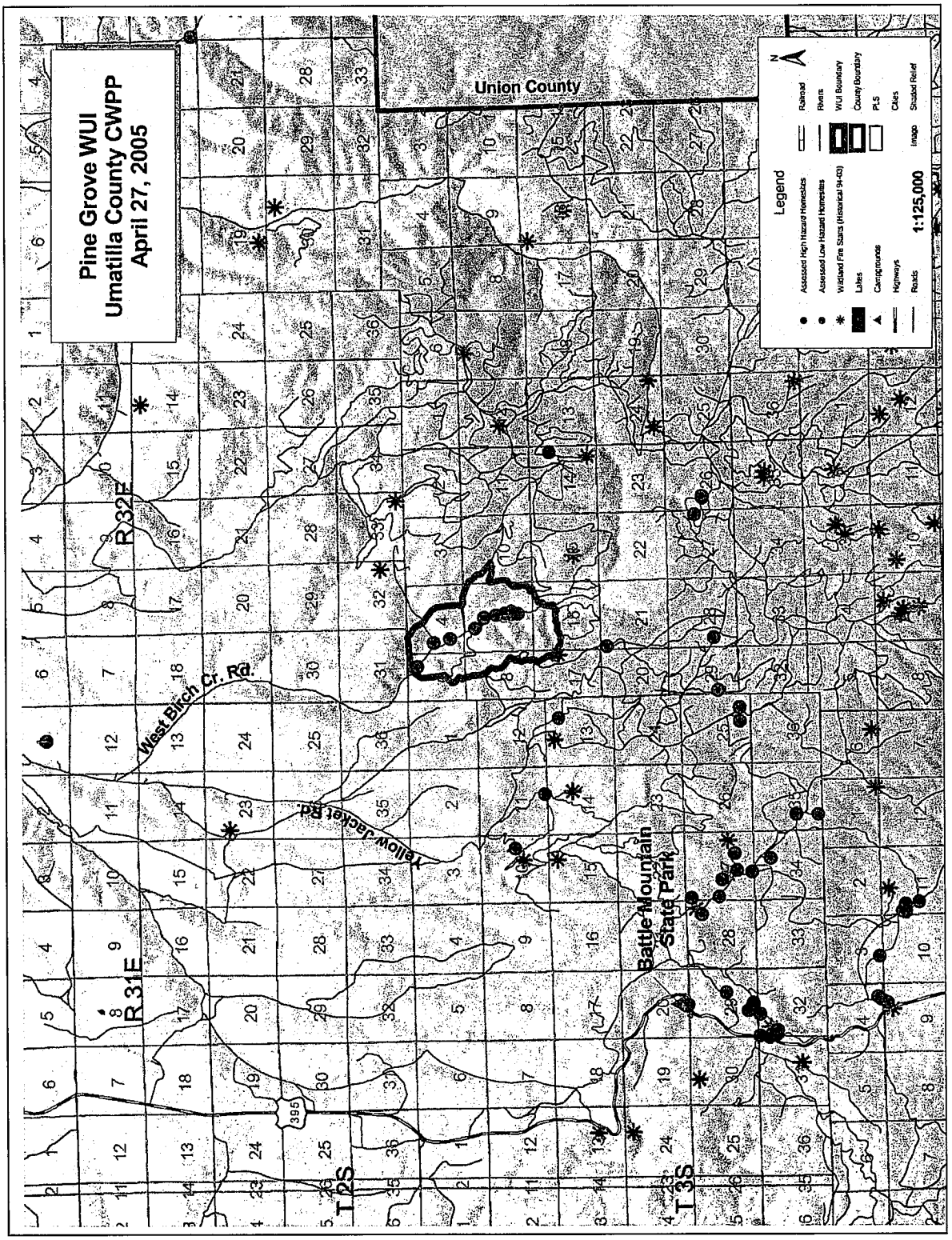


Figure 21. Pine Grove WUI Boundary with Density and Historical Wildland Fire Starts

Table 13. Camas WUI Planning Sheet

WUI Name: Camas **Priority Category:** MODERATE

Description: Small group of homes at junction of NFJD River and Camas Ck surrounded by dry, pine site; major north-south state highway corridor along canyon bottom; minimally-managed wildlife area nearby with no access poses heavy fuel threat to area;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	5	3	4	3	1	15

Education Projects	Timeframe	Lead Agency/Cooperators
• Complete house-to-house prevention visits and promote defensible space	• Summer 2004 90% complete	• ODF
•	•	•
•	•	•
•	•	•
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Create defensible space around structures	• Ongoing	• ODF & landowners
• Maintain travel corridor right-of-ways (weeds and brush)	• Ongoing	• ODOT
• Complete the Fall Meadowbrook HFR (timber sale/fuels treatment project) - Environmental Analysis to be completed by FY06;	• In progress; 1-4 years	• USFS
•	•	•
•	•	•
Limitations: Funding for fuels reduction treatment to implement Falls Meadowbrook and other future potential projects for Camas area;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Work to enhance Ukiah Volunteer Fire Department capacity and response area	• Ongoing	• Ukiah Fire Dept. & ODF
•	•	•
•	•	•
•	•	•
Limitations:		

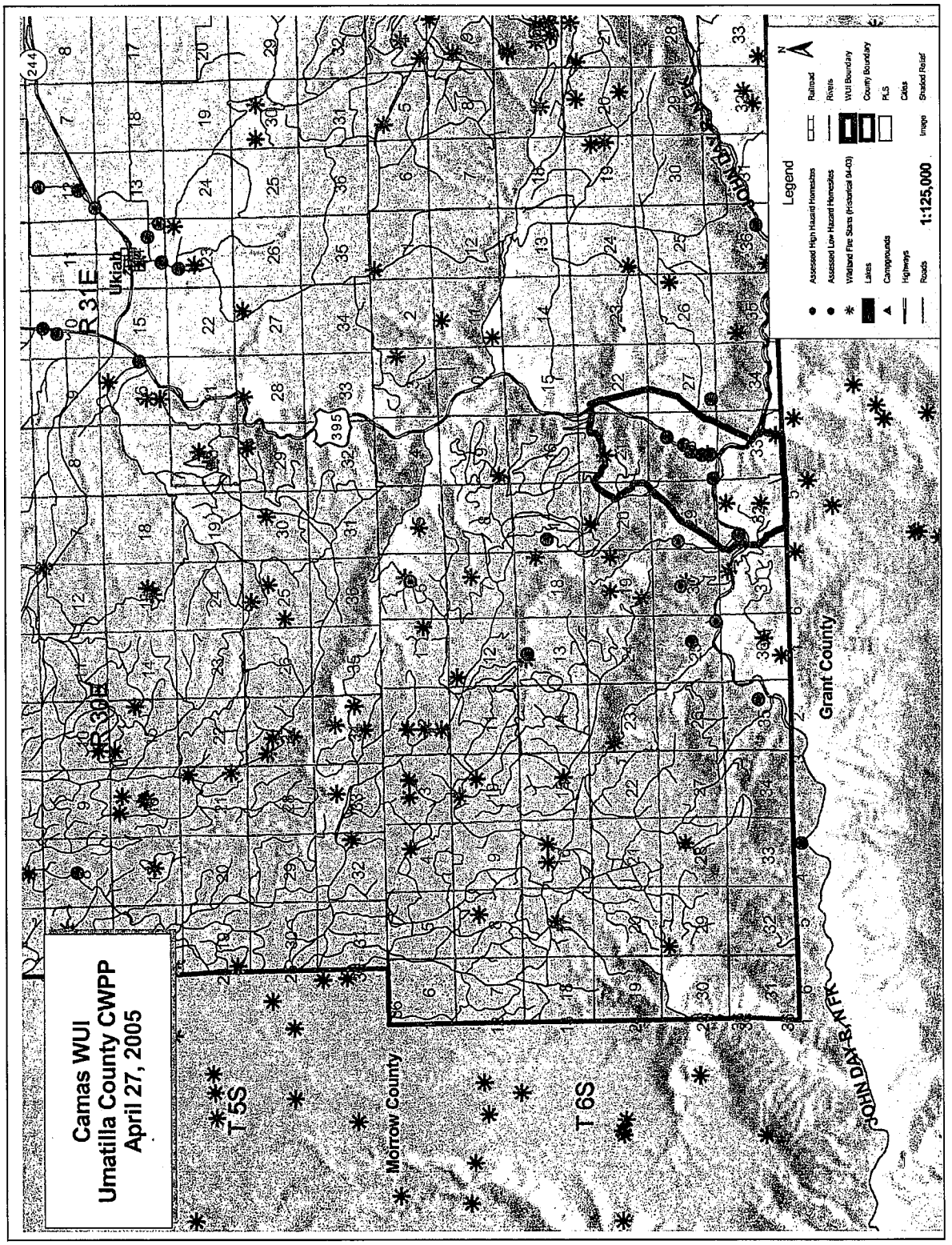


Figure 22. Camas WUI Boundary with Density and Historical Wildland Fire Starts

Table 14. Upper 204 / Tollgate WUI Planning Sheet

WUI Name: Upper 204 / Tollgate **Priority Category:** MODERATE

Description: Starting about milepost 10.5 at Weston Pond; upper elevation; heavy subalpine fuel types, moist, long-term fire interval; stand decay becoming evident; concentration of year-round and weekend residential area with many out-of-state property owners;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
1	3	4	5	1	1	15

Education Projects	Timeframe	Lead Agency/Cooperators
• Implement Public Use Restrictions to address human-caused ignitions	• Summer mos.	• USFS, ODF & EUCRFD
• Develop cost-share options to create firebreaks on CRP acres	• Ongoing	• NRCS & ODF
• Target & provide prevention patrols in areas of high fire concern	• Summer mos.	• USFS, ODF & EUCRFD
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF
• Promote safe debris burning activities	• Year-round	• ODF & EUCRFD
• Complete homesite assessment and promote defensible space	• Ongoing	• ODF & EUCRFD
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Review & evaluate fuels projects in conjunction with USFS	• Ongoing	• USFS & ODF
• Maintain travel corridor right-of-ways (weeds and brush)	• Ongoing	• ODOT
• Complete prescribed burning – NF Umatilla wilderness and Walla Walla WS	• NEPA (approx. two years)	• USFS
• Create defensible space around structures	• Ongoing & year-round	• ODF, EUCRFD & landowners
• Review ingress/egress issues & complete improvements as appropriate	• Ongoing & year-round	• ODF, EUCRFD & landowners
Limitations: landowner interest in fuels treatment; funding for fuels treatment projects; out-of-state landowners; topography of area; restrictions associated with wilderness areas; ESA including Lynx;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Implement Partners in Protection program	• Summer mos.	• ODF and landowners
• Work to enhance rural fire protection capacity through grants	• Ongoing	• EURFD & ODF
• Locate and GPS water source sites and put into Spotfires database	• Ongoing	• ODF, USFS & EUCRFD
• Explore locating substation in Langdon Lake area (structural protection) to help with homeowners' fire insurance coverage	• Ongoing	• EUCRFD
Limitations: finding interested landowners in strategic areas of county for pumper program to help improve citizen response and initial attack; look into feasibility of additional substation to help with ISO rates for unprotected structures;		

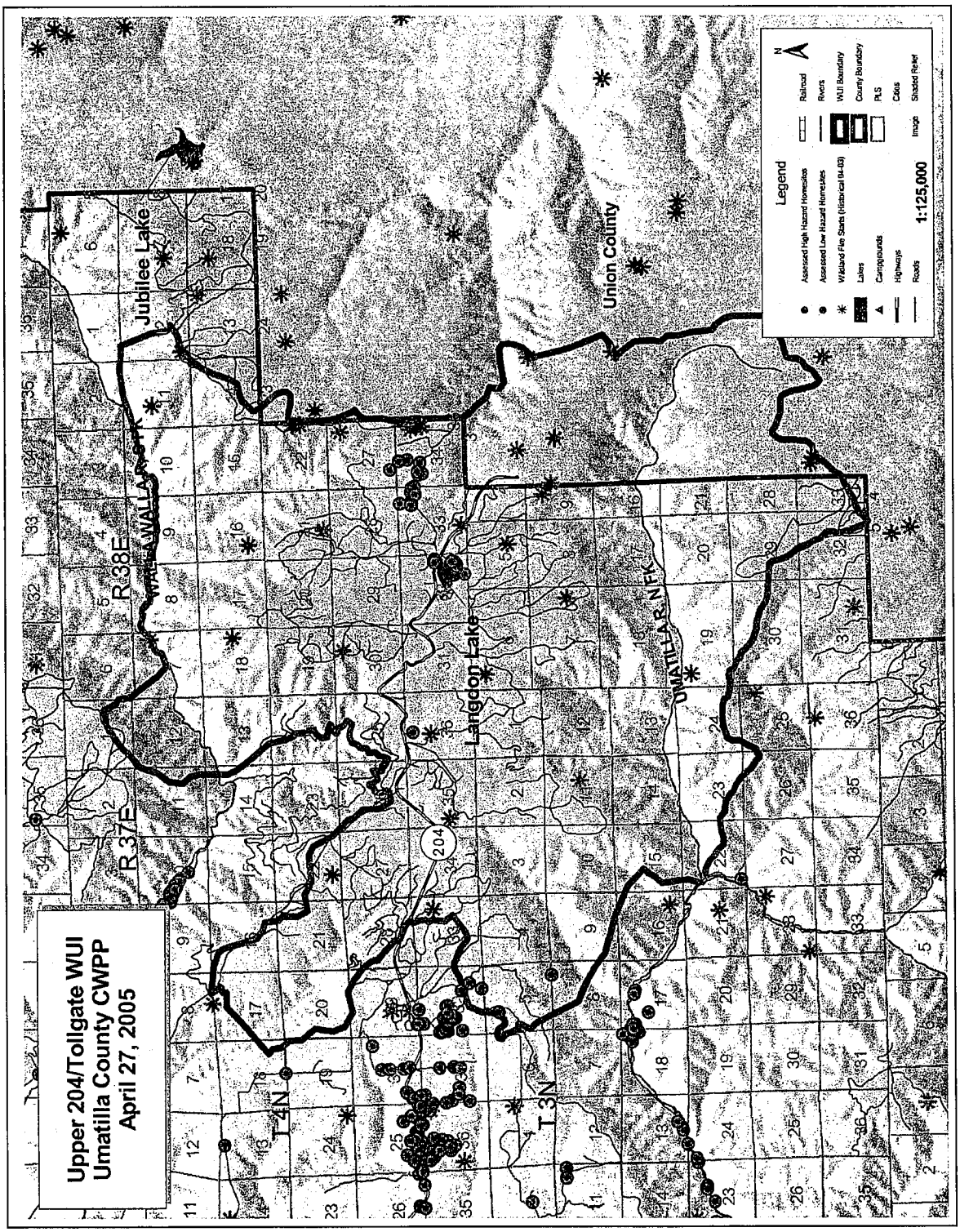


Figure 23. Upper 204/Tollgate WUI Boundary with Density and Historical Wildland Fire Starts

Table 15. Ukiah WUI Planning Sheet

WUI Name: Ukiah **Priority Category:** MODERATE

Description: Largest community in south portion of county at junction of major travel corridors; surrounded by predominately-mixed pine and grass fuel types;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	1	3	3	3	1	13

Education Projects	Timeframe	Lead Agency/Cooperators
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF
• Implement Public Use Restrictions to address human-caused ignitions (tourists/hunters/etc.)	• Summer – fall	• USFS& ODF
• Target & provide prevention patrols in areas of high fire concern	• Summer – fall	• USFS & ODF
•	•	•
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Create defensible space around structures	• Ongoing	• ODF & Ukiah Fire Dept.
• Complete Western Route fuels treatment project area near WUI	• Close to signature; implementation 2-4 yrs	• USFS
• Evaluate and promote private land fuels reduction projects as warranted	• Ongoing	• ODF & landowners
•	•	•
•	•	•
Limitations: Past timber treatment and grazing activities have helped reduce fuels loading around town – however, both activities are done less and less each year; no USFS projects currently proposed within five air miles of Ukiah due to property ownership;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Work to enhance capacity of City of Ukiah Fire Department	• Ongoing	• City of Ukiah & ODF
•	•	•
•	•	•
•	•	•
Limitations:		

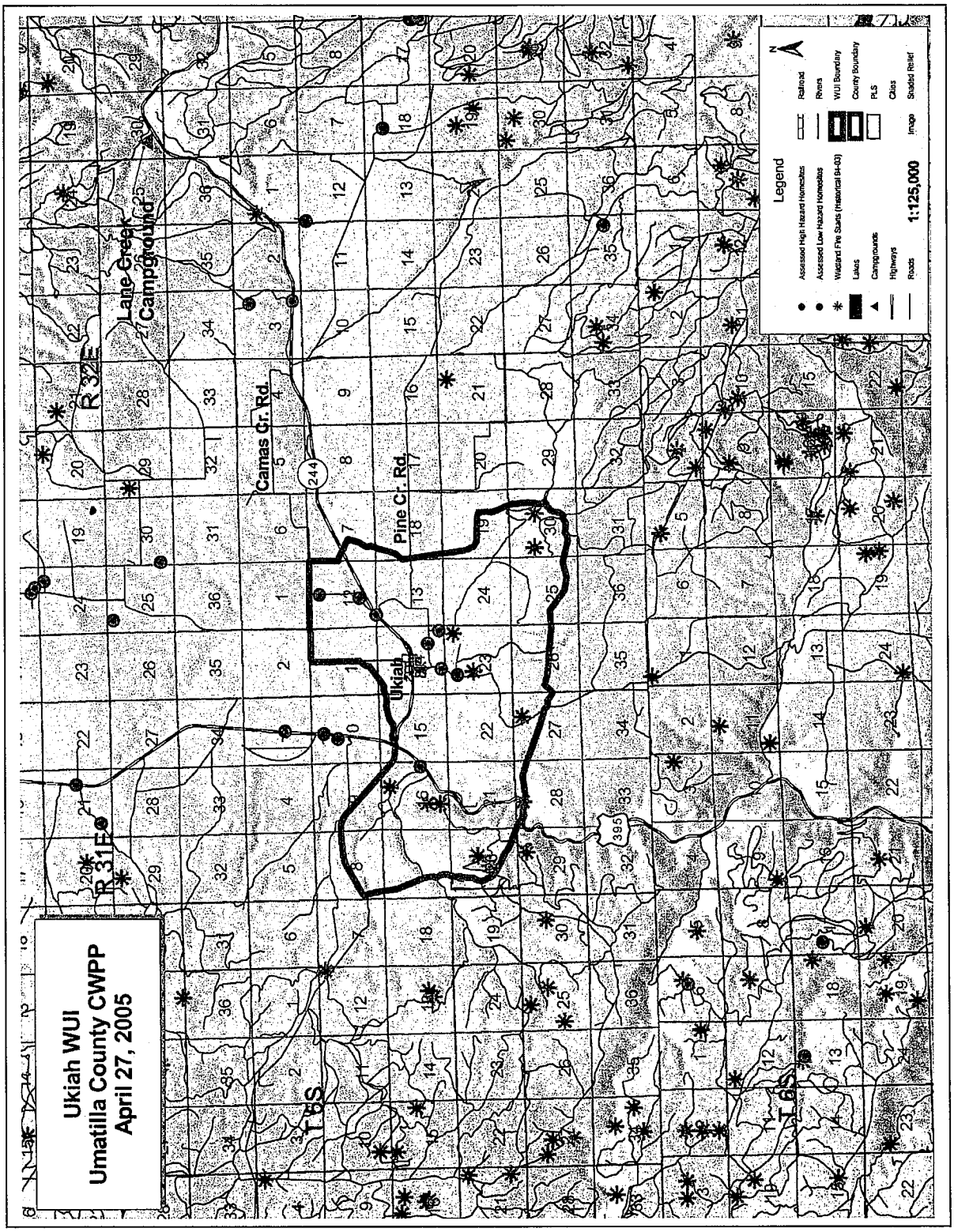


Figure 24. Ukiah WUI Boundary with Density and Historical Wildland Fire Starts

Table 16. Birch WUI Planning Sheet

WUI Name: Birch **Priority Category:** MODERATE

Description: Populated stream corridor with primarily riparian brush and deciduous tree species leading to steep, grassy slopes; numerous year-round homesites scattered through area;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	1	3	3	2	1	12

Education Projects	Timeframe	Lead Agency/Cooperators
• Target & provide prevention patrols in areas of high fire concern	• Summer – fall	• ODF
• Implement Public Use Restrictions to address human-caused ignitions	• Summer – fall	• ODF & CTUIR
• Evaluate prevention efforts around Hum-Te-Pin Lake & implement as appropriate	• Summer – fall	• ODF & CTUIR
•	•	•
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Create defensible space around structures	• Ongoing	• ODF, Pilot Rock RFD & CTUIR
• Complete debris clean up of ice storm damage around Hum-Te-Pin Lake	• 1-2 years	• CTUIR
•	•	•
•	•	•
•	•	•
Limitations:		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Implement Partners in Protection program	• Ongoing	• ODF & landowners
• Work to enhance rural fire protection capability through grants	• Ongoing	• Pilot Rock RFD
•	•	•
•	•	•
Limitations:		

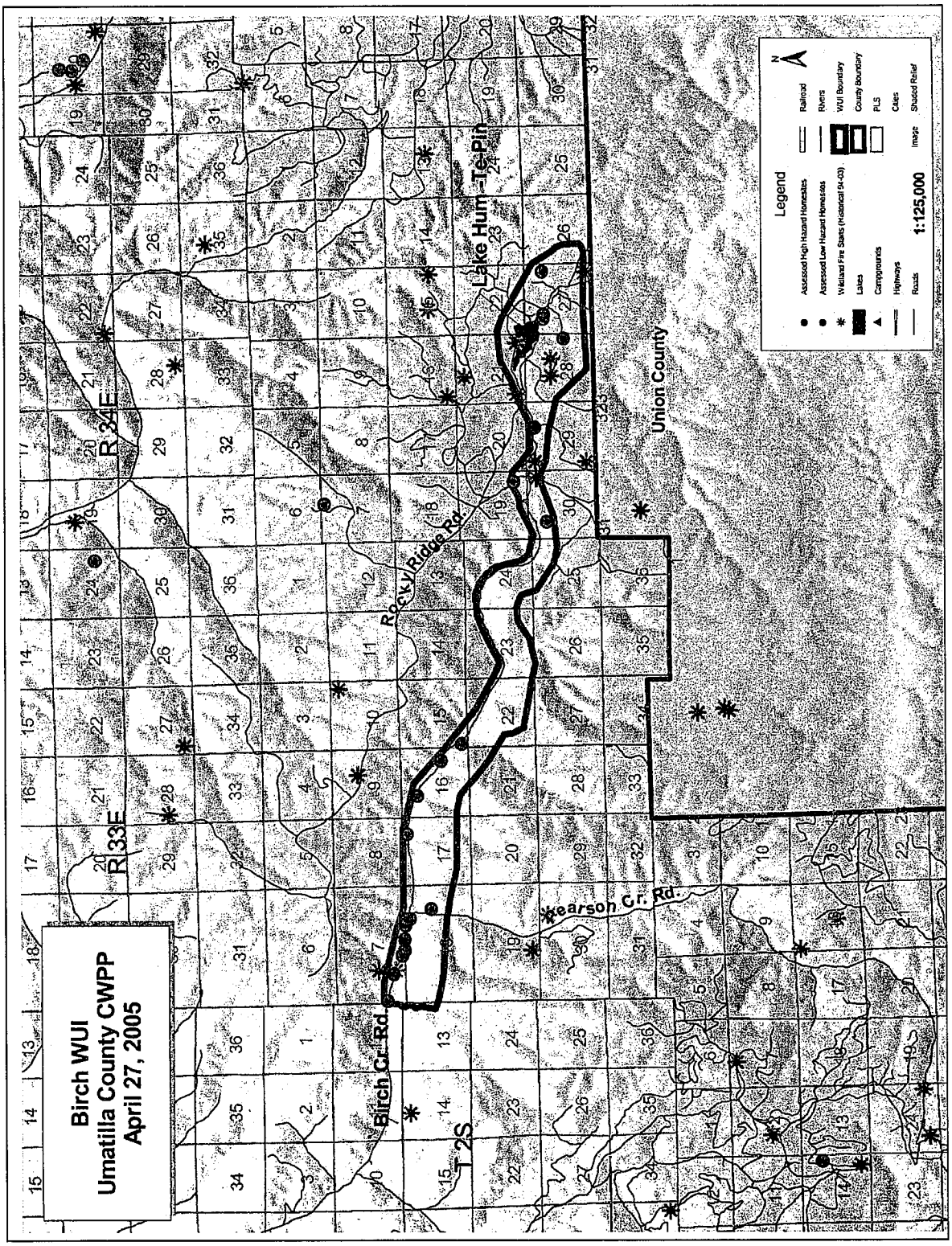


Figure 25. Birch WUI Boundary with Density and Historical Wildland Fire Starts

Table 17. Pearson Guard Station WUI Planning Sheet
WUI Name: Pearson Guard Station **Priority Category:** MODERATE

Description: Very small cluster of leased forest service cabin sites all within the federal forest lands; USFS has obligation to the permitees to manage the vegetation and fire fuels; USFS buildings are on the historical list;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
3	1	1	4	2	0	11

Education Projects	Timeframe	Lead Agency/Cooperators
• Target & provide prevention patrols in areas of high fire concern	• Summer – fall	• USFS
•	•	•
•	•	•
•	•	•
•	•	•
Limitations:		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Create defensible space around structures	• Ongoing	• USFS & permitees
• Review & evaluate the need of an Environmental Analysis for future treatment work around buildings and complete the EA as appropriate	• By 2010	• USFS
• Maintain vegetation and fire fuels levels near the WUI	• Ongoing	• USFS
•	•	•
•	•	•
Limitations: Funding for fuels reduction treatment;		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
•	•	•
•	•	•
•	•	•
•	•	•
Limitations:		

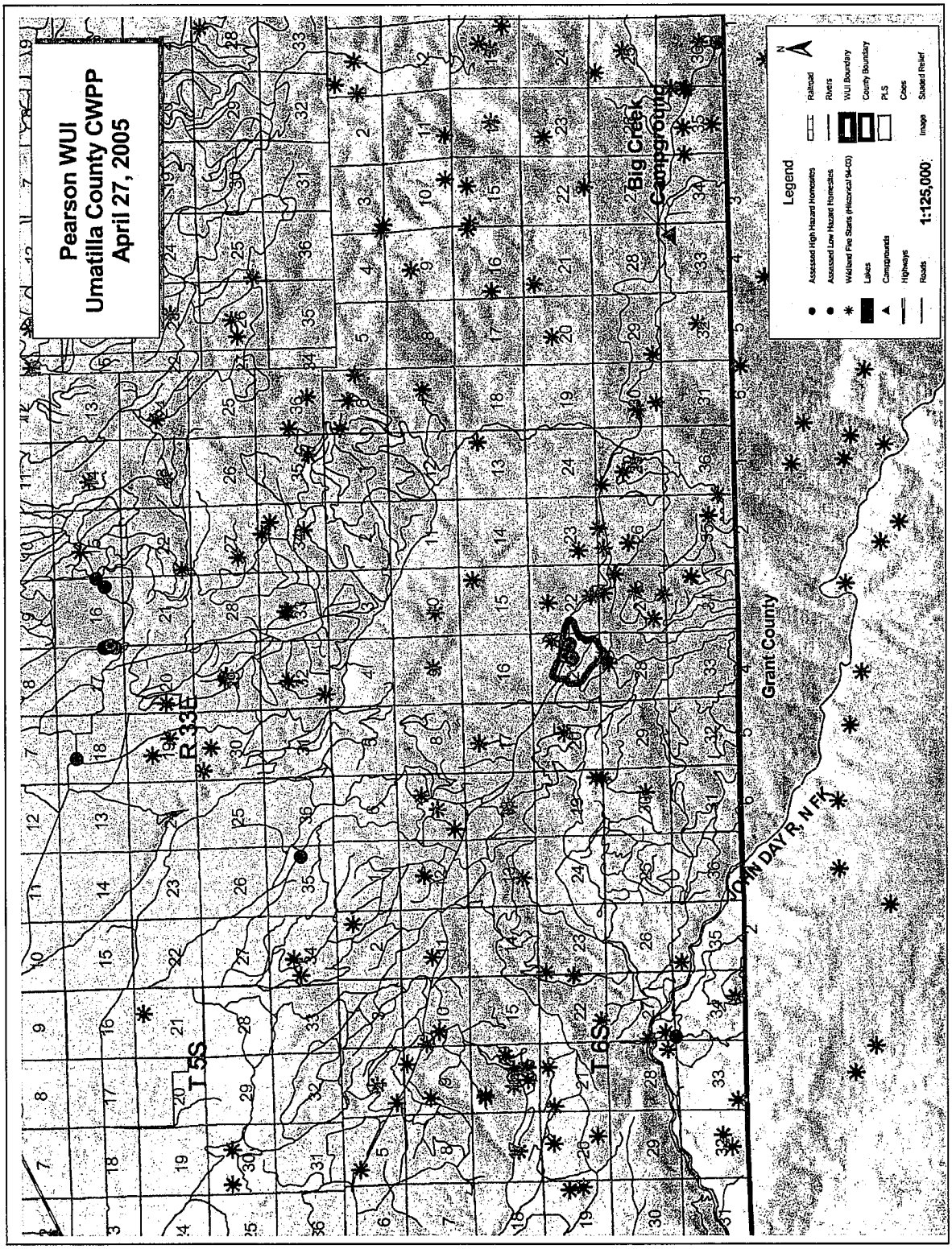


Figure 26. Pearson Guard Station WUI Boundary with Density and Historical Wildland Fire Starts

Table 18. McKay WUI Planning Sheet

WUI Name: McKay **Priority Category:** MODERATE

Description: Populated stream corridor with primarily riparian brush and deciduous trees that lead to steep, grassy slopes; numerous year-round homesites scattered through area;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
2	1	2	3	2	1	11

Education Projects	Timeframe	Lead Agency/Cooperators
• Target & provide prevention patrols in areas of high fire concern	• Summer – fall	• ODF & CTUIR
• Implement Public Use Restrictions to address human-caused ignitions	• Summer – fall	• ODF & CTUIR
• Promote fire prevention awareness	• Summer – fall	• ODF & CTUIR
•	•	•
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Create defensible space around structures	• Ongoing	• CTUIR, ODF, Pilot Rock RFD & landowners
•	•	•
•	•	•
•	•	•
•	•	•
Limitations:		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Implement Partners in Protection program	• Ongoing	• ODF & landowners
•	•	•
•	•	•
•	•	•
Limitations:		

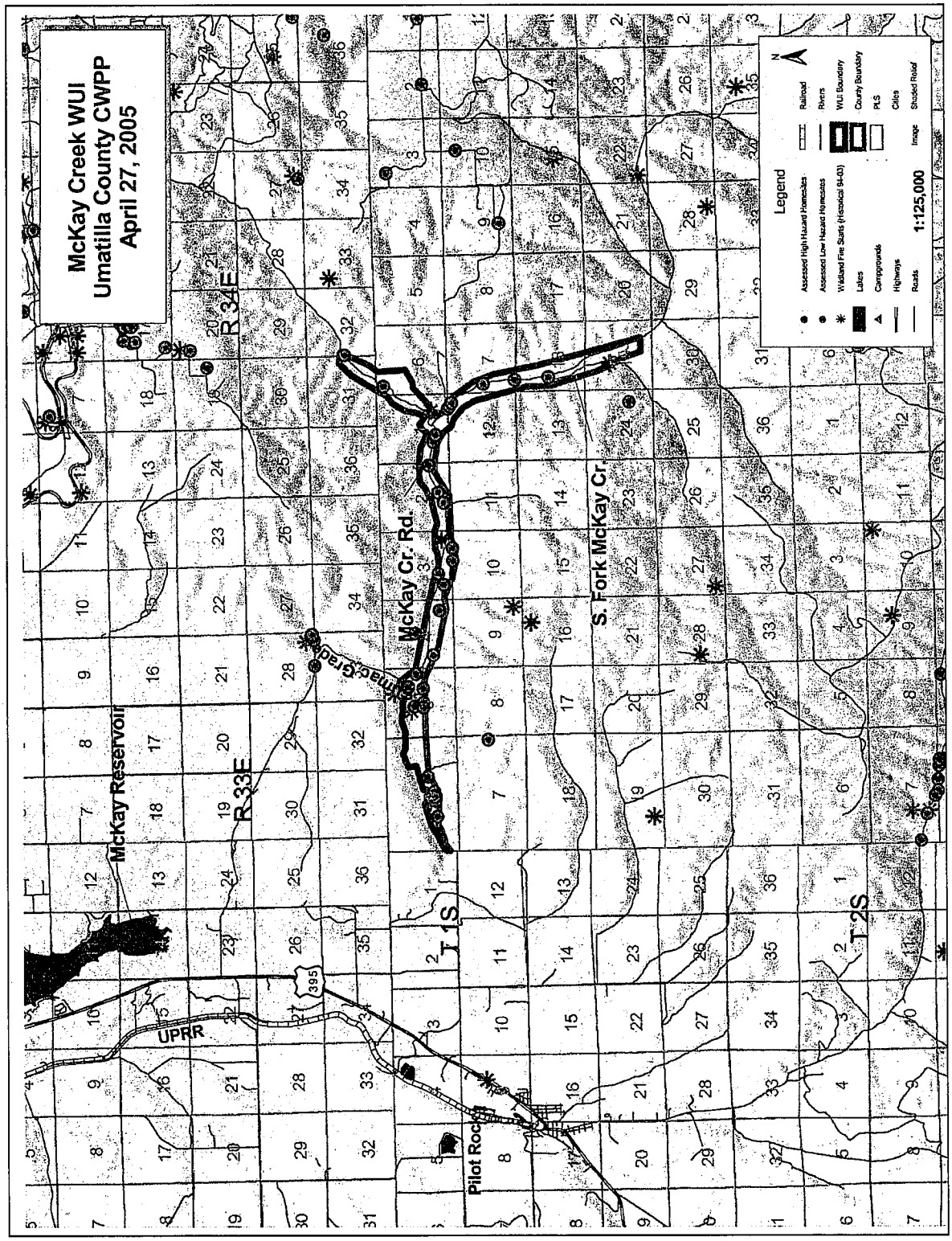


Figure 27. McKay WUI Boundary with Density and Historical Wildland Fire Starts

Table 19. Walla Walla River WUI Planning Sheet

WUI Name: Walla Walla River **Priority Category:** LOW

Description: River corridor with heavy deciduous fruit crops and steep, heavily-brush covered slopes with timbered stringers; numerous small acreages and homesites as well as a county park;

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Structural Vulnerability	Weather	Values At-Risk	Aggregate Score
1	1	1	3	2	1	9

Education Projects	Timeframe	Lead Agency/Cooperators
• Target & provide prevention patrols in areas of high fire concern	• Summer – fall	• ODF
• Implement Public Use Restrictions to address human-caused ignition	• Summer – fall	• ODF
• Evaluate area for SB 360 program & implement as appropriate	• 1-3 years	• ODF
•	•	•
•	•	•
Limitations: Funding for personnel in summer months;		

Treatment Projects	Timeframe	Lead Agency/Cooperators
• Create defensible space around structures	• Ongoing	• ODF & landowners
•	•	•
•	•	•
•	•	•
•	•	•
Limitations:		

Emergency Response Projects	Timeframe	Lead Agency/Cooperators
• Work with Milton-Freewater RFPD for coordinated mutual aid response	• Ongoing	• ODF & Milton-Freewater RFPD
• Maintain relationship with Harris Park caretaker re: ATV/motorcycle use and other public use restrictions education	• Ongoing	• ODF
•	•	•
•	•	•
Limitations:		

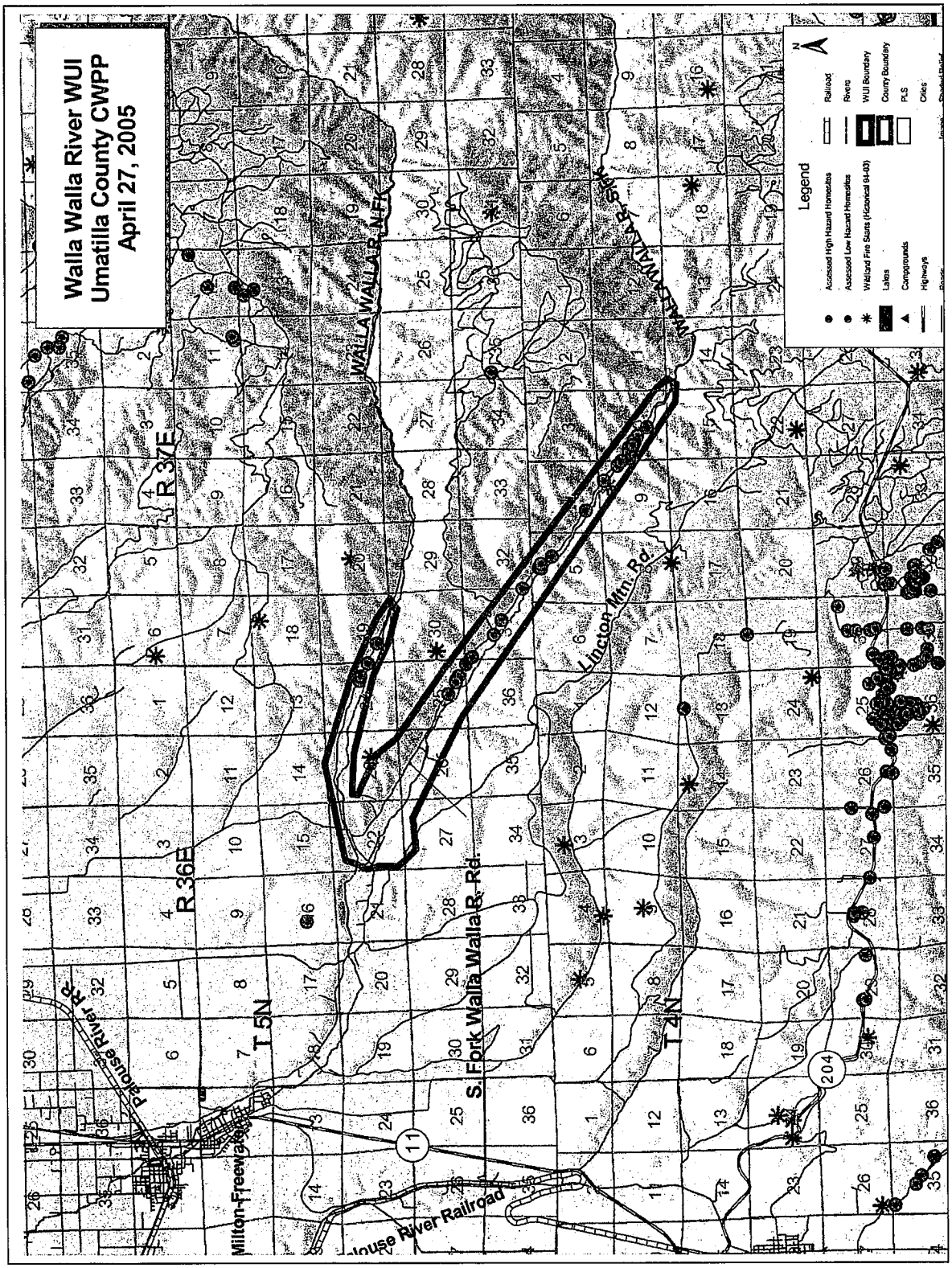


Figure 28. Walla Walla River WUI Boundary with Density and Historical Wildland Fire Starts

Development of a Fuels Maintenance Program[11]

Developing a fuels maintenance program requires knowing the plant association and defining acceptable fire behavior parameters. Projections can then be made to determine when a particular site will move beyond acceptable fire behavior criteria and require some level of re-treatment.

Once treated, stands undergo the process of ecological succession in which understory and overstory vegetation changes over time, resulting in incremental changes (often increases) in herbs, grasses, shrubs, and regeneration of trees because more growing space has been created by the removal of trees and other vegetation. Overstory structure changes too as residual trees expand their crowns and increase in diameter, continually adding more biomass to the site in the form of needles, branches, or downed logs. Subsequent disturbances caused by insects and disease can kill trees and add more biomass to the forest floor. Although some of this biomass decays over time, in the dry forests of southwest, central and eastern Oregon, dead biomass tends to accumulate on the forest floor faster than it decays, adding more fuel to the landscape.

The amount of time before treated areas will require re-treatment is dependent on several factors including:

- Past treatment level (e.g., how much biomass (fuel) was removed initially in the understory and overstory)
- Plant association groups
- Site productivity
- Rate of fuel accumulation
- Fuel structure (i.e., condition class)
- Historic fire regime
- Desired fire behavior (for effective control)
- Climatic regime

While condition class and fire regime are the two primary factors in prioritizing areas initially for treatment, this method may have less of a bearing in deciding which areas should be prioritized for *re-treatment* in the future. For example, it's unlikely that managers would allow sites that began as condition class 2 or 3 prior to treatment and treated to condition class 1, to revert to condition class 2 or 3 before conducting the re-treatment, particularly in WUI areas. It seems more likely they would allow a site that was originally in a condition class 2 or 3 and treated to condition class 1 to re-accumulate fuels only to a point or phase that resembles a condition class 1 *transitioning* into class 2 conditions. Allowing fuels to accumulate any further would entail more expensive re-treatment and increase the risk of loosing the initial investment made in fuel reduction.

Biomass Utilization and Economic Development[12]

> ***Biomass*** is the renewable organic matter such as agricultural crops and residue, wood and wood waste, animal waste, aquatic plants, and organic components of municipal and industrial wastes.

Living plant material is the source of all biomass fuel. Some biomass fuel resources are waste products left over after plant materials have been used for other purposes or consumed by animals. Other biomass resources are plant materials directly harvested for their energy value. Biomass fuels are readily available throughout the world. Oregon's biomass resources include wood, agricultural crop residue and organic waste.

Firewood harvested from Oregon's forests has long been a bioenergy resource for home heating. Private individuals and commercial companies cut firewood from public and private forestlands in the state. Scrap and salvaged wood are other sources of wood fuel for home heating use. Twenty-two percent of Oregon households use wood heating as either their main method of space heating or as a back-up heating resource. The Oregon Department of Energy estimates that about 480,000 cords of firewood were consumed in 2003.

Forest biomass is generated from commercial timber harvest, non-commercial thinning, and timber stand improvement activities. Non-commercial thinning (pruning and tree removal) is designed to help shape and guide development of forest stands to meet a variety of goals. It generally does not result in removal of trees that can be used to manufacture products, but it could be used in renewable energy production (heat, steam, electricity, and fuel). Timber stand improvements (TSI) can accomplish similar goals but often results in the removal of some commercially valuable trees. Wood manufacturing residues (bark, sawdust, chips, and veneer cores) are additional sources of raw material for renewable energy production. Thinning and prescribed burning in strategic locations is often used to reduce forest fuels and wildfire risks, but most of the material generated from these types of fuels reduction activities is not suitable for wood products manufacturing. In many cases, biomass material from these activities is left on-site or piled and burned at an additional cost.

Local Biomass Utilization Opportunities

Biomass has the opportunity to become a market-driven solution for overstocked forest stands in Umatilla County. Partnerships are being developed among the Oregon Department of Energy, ODF, and other interested agencies across the NEO District to assess a variety of local biomass utilization opportunities. Energy credits and some type of subsidy incentive are critical to making this a viable enterprise. In Umatilla County, the outlook for utilizing biomass (in particular wood products) is still under assessment. There are several wind power generation facilities currently in operation and additional "wind farms" planned for other sites in the county. While there are a few facilities that use wood products in neighboring counties, the cost of

transporting biomass material from forest operations in Umatilla County to those facilities are not economically feasible at this time.

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[11] *A Conceptual Approach for a Maintenance Strategy for Fuel Treatments in Oregon: Maintaining the Investment*, Fitzgerald, Stephen and Martin, Charlie, Oregon State FFHM Committee Report, July 5, 2004.
[12] http://egov.oregon.gov/ENERGY/RENEW/Biomass/use.shtml

9. Emergency Management

Protection Capabilities & Infrastructure Protection

Inventory of fire protection resources

An inventory of various local fire resources can be found in Appendix C.

There are several agencies involved in wildland fire suppression that work together to provide protection across the interface areas of Umatilla County. Resources range from a strictly volunteer department with little training, to a department with some paid staff along with several trained volunteers, to federal and state agencies that hire paid, full-time seasonal firefighters. Fire vehicles range from 200-gallon engines to 5,000-gallon tenders.

Most of the local resources have at least some radios that are programmable to wildland fire frequencies. All of the emergency fire agencies (with the exception of WA-DNR and Walla Walla Fire District #4) participate and coordinate as members of the Umatilla/Morrow County Fire Defense Board, to work together for mutual aid activities. These agencies have the ability to utilize a common radio communication frequency as needed: the Oregon State Fire Marshall frequency for command and tactical operations. Agencies have also agreed through mutual aid agreements in place, to allow other fire agencies to use their frequency as appropriate.

Each district or department faces unique challenges in dealing with wildland fires. Having to rely on volunteers for firefighting needs is a common struggle for several rural fire districts. Quick initial response can be impacted by limited resources, especially when firefighters have to be pulled off their "regular" jobs. Wildland fires can occur in terrain that is rural, remote, and difficult to reach quickly. Roads may be in poor condition, private gates locked, and private bridges may be unable to accommodate heavier, firefighting vehicles. Ingress and egress issues are a constant problem in certain areas of the county. Appropriate wildland training is an ongoing challenge for districts that rely on volunteer forces; it demands a high level of commitment from those citizens to maintain current training standards. Having water sources available is also a concern. Pilot Rock RFD has added water tanks at strategic locations across their protection district to improve available water supply. Others are working on improving access to water sources.

Home Site Access

The first consideration for suppression forces fighting a wildfire in any situation is safety. They must be able to quickly and effectively attack the fire but only in as safe a manner as possible. Firefighters use a variety of structural fire fighting equipment such as engines, brush rigs, or tenders to protect homes from wildfire. These specialized vehicles require more space to turn around in and higher clearances than the typical cars and pickups.

Suppression forces will first consider if accessing a home will put them at risk while attacking the fire. Criteria they might consider include:

- Does the access road have proper clearance overhead;
- Is there turn around space once inside?
- Is there more than one way out?
- Are there multiple structures down this road?
- Have suppression forces reviewed the area prior to the emergency?

Clearly marked rural address numbers at the start of your access road greatly aids fire suppression efforts. Firefighters may be working during darkness to protect your home. Having to search for the address takes time away from protection efforts. Having an adequate and safe area for firefighters to work around your home is a key factor of access. Defensible space not only provides a safety area for the home, but for firefighting resources as well. Issues such as the road gradient, surface material, length, available turnouts, or turn-a-rounds are essential considerations during the initial assessment of the incident. Overgrown roadside vegetation could become a flame front, trapping firefighters. Aboveground utility lines running along your access may also become a hazard for vehicles with higher clearance requirements. Umatilla County Road Standards require a 60-foot right of way, with a 22-foot driving surface and a 50-foot radius turning circle with a 40-foot radius turning circle driving surface. This is a "C" cul-de-sac.

Telephone trees, emergency contacts, community information database

According to residents who attended the public meetings, telephone trees are not in place in any of the communities that hosted meetings. The idea of some type of formalized phone tree was suggested by a few community members, but without the lead of a community member or local agency, this is unlikely to occur.

Emergency Alerting

The county will utilize NOAA Weather radio system when activating the Emergency Alert System to notify residents of an emergency evacuation. Residents of fire prone areas are encouraged to utilize the NOAA weather radio system. NOAA receivers are available for a nominal fee wherever radios are sold. The radio will activate when it receives an alert signal and then provide the emergency information. NOAA radio signals are heard throughout the Umatilla County's Blue Mountains/Foothills region.

Another useful tool for wildfire notification to the public could be the Tone Alert Radio (TAR) system currently being used by the Chemical Stockpile Emergency Preparedness Program (CSEPP) as part of the notification program for the weapons destruction activities at the Umatilla Army Depot in the far western edge of the county. The primary CSEPP office is located at the Umatilla County Emergency Services complex in Pendleton, right off I-84. While radios have been provided to residents in the western portion of the county, more directly affected by the Depot's program, a transmitter was installed at the Pendleton NWS office in January 2005; the purpose of this system is to alert first responders in the Pendleton, Athena, Pilot Rock areas, and the Tribes. Radios have now been provided to the ODF and PICC

offices in Pendleton. The county's Emergency Management program has the ability to send out EAS messages (emergency alert system). Along with the Weather Bureau, they can break in on area radio stations and television stations and provide emergency information to county residents (in the event of a wildfire).

Notification

Umatilla County would utilize the following methods to notify residents in a fire area of an impending wildfire hazard or other emergency:

- Emergency Alert System
- Radio news broadcasts or announcements
- Door-to-door
- Emergency Vehicle sirens/public address announcements
- Local Phone Trees
- Person notification

Umatilla County would implement a Joint Information System to provide the latest information to the public and media. Resources of the County Public Information Officer and Joint Information Center, and other appropriate agencies (US Forest Service, Oregon Department of Forestry, tribal and other agencies) would be combined to respond to the public's need to know. All releases would be coordinated with the Incident Commander or appropriate authority.

During a wildfire incident, agencies need to provide accurate and timely information about the incident, especially to affected communities in wildland-urban interface areas. While the primary purpose of *notification* is to alert people to a wildfire hazard, the purpose of providing *updated information* is to share ongoing suppression actions, evacuation trigger points, evacuation area status, and projected future size/impacts from the wildfire.

Two factors that might affect the timely delivery of information beyond the initial emergency notifications are: 1) the overwhelming nature of a fast moving event, and 2) limited personnel resources immediately available.

Web sites, information hot lines, public meetings within communities, and press releases have been successfully used in the past to help provide updated information to local communities.

Evacuation

Evacuation may become necessary to protect the lives of residents of a community during a hazardous and unpredictable event like a wildfire. By removing the threat to life from an area, firefighters can avoid the split focus of

Critical Home Documents
- ✓ *Insurance Papers*
- ✓ *Financial Account #s*
- ✓ *Will / Estate planning*

worrying about people in the hazard area as they work to suppress the fire and protect property.

The Incident Commander may order evacuation when evacuation is determined to be the best method of protecting the public from the fire. Evacuation will be directed by the Umatilla County Sheriff or his Deputy. Public shelters may be opened during evacuations, and evacuees will be advised of shelter locations. Shelters may provide food, housing, and information to those displaced by a wildfire. The American Red Cross (ARC) is the lead agency in establishing public shelters, and is integrated into Umatilla County's emergency plan. It is the responsibility of all residents and visitors to fire prone areas to have a 72-hour kit and be able to maintain their selves and families with needed medications, clothing, snack foods, and other necessities if they are advised to evacuate. The American Red Cross will attempt to support evacuees in obtaining emergency prescription medications and serve as a conduit for health or welfare messages between evacuees and their friends and family.

The County Sheriff or other law enforcement agency will be the lead agency in protecting property within evacuated areas and in establishing traffic control points related to wildfire. Traffic control is one of the key elements of any evacuation plan. Evacuations seek to remove the threat to life by moving people out of the hazard area. Traffic control points around the perimeter of an incident are necessary to prevent people from getting back into the hazard area until it is determined safe to do so.

Where to Report a Wildland Fire Emergency

There are two primary ways to report a wildfire in Umatilla County. The easiest and most commonly used phone number is to dial 9-1-1. However, in those cases where the person reporting the wildfire knows that it is located on forestlands protected by either the Umatilla National Forest or Oregon Department of Forestry, contact the PICC dispatch center and report the fire directly to them. Keep these numbers by your telephone for reference:

For areas within the Northeast Oregon forestlands (ODF and USFS)

Dial: 541-278-3732 (PICC dispatch)

(After hours calls will be transferred to answering service and dispatch duty officer)

For all other wildland fire emergencies:

Dial 9-1-1

10. Monitoring and Evaluation

Schedule

The maintenance for this plan will be directed by the Umatilla County Commissioners but coordinated and completed through the CWPP Steering Committee. The committee will reconvene annually to review and reevaluate:

- The plan, goals, and objectives
- Designated WUI boundaries and Communities-at-risk
- Strategy recommendations as various tasks/projects are accomplished and areas at-risk decline in hazard level
- Priorities for action items and progress
- Infrastructure changes in County including:
    - population changes in WUI areas
    - land use changes, in particular as related to implementation of SB360
    - emergency services capacity levels
    - computer software and data updates, such as tax lot project

A complete revision of the CWPP will be completed every five years by the Steering Committee and submitted to the County Commissioners for their approval. If during annual reviews or following some unforeseen condition that warrants a modification in this schedule, the committee may use their discretion to complete the review and revision as warranted.

Continued Public Involvement

The participation of the public in future reviews of the Umatilla County CWPP will be necessary to accomplish many of the recommendations. Public meetings will be scheduled and advertised to generate participation of interface residents.

Color copies of the plan will be available for review at the Umatilla County Courthouse, local public libraries, and on the web at:

http://www.odf.state.or.us/AREAS/eastern/northeast/umatco_cwpp.htm

The website will provide citizens with an ongoing opportunity to provide comments or send questions to the Steering Committee in the future.

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11. Appendices

Appendix A: City of Walla Walla CWPP (includes Mill Creek Watershed)

Note: The City of Walla Walla CWPP Steering Committee is currently working on this planning document. When completed and approved by committee members, the document will be included in the Umatilla County CWPP.

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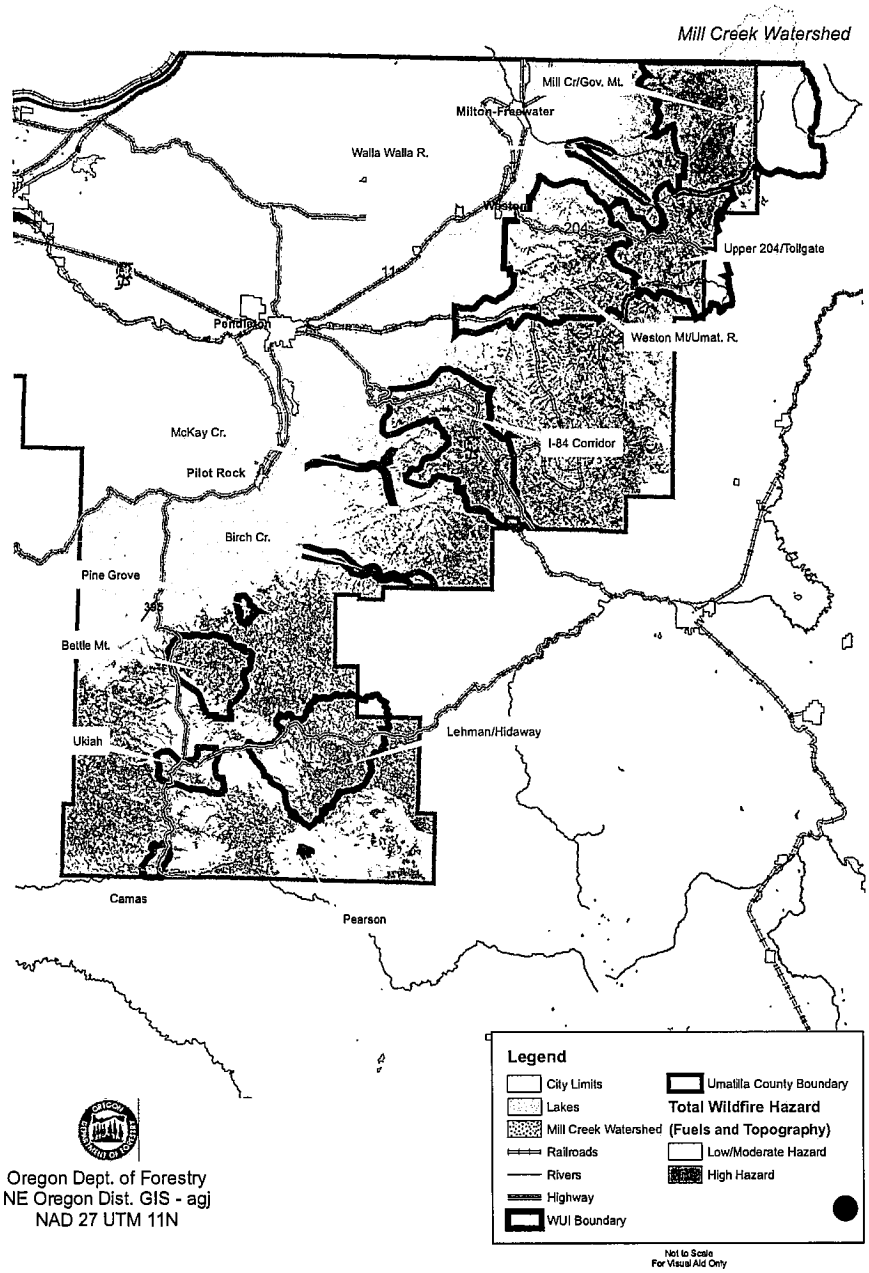
Appendix B: Total Wildfire Hazards for Umatilla County CWPP

Total Wildfire Hazard Map
Fuels and Topography
Umatilla County CWPP
June 16, 2005



Oregon Dept. of Forestry
NE Oregon Dist. GIS - agj
NAD 27 UTM 11N

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Appendix C: Inventory of Local Suppression Resources

Agency	Protection Area	Suppression Services	Employees	Engines Available	Programmable Radios
BIA	Trust Lands	Wildland	4 BIA and 2 CTUIR (in BIA office)	2 - Type 6 engines (250 gal) 1 - Type 4 engine (750 gal)	Yes
City of MF		Both			
City of Pendleton		Both			
City of Ukiah	city of Ukiah	Structural			
CTUIR		Structural			
East Umatilla RFPD	Highway 204 corridor & Umatilla Rv Rd	Both	? Volunteers & 1.5 paid staff	3 - Type 1 engines 4 - brush Type 6 engines 3 - Types 1, 2, and 3 tenders 1 - brush Type 4 engine	Yes - with ODF
Meacham RFD		Both	volunteer only		
Milton-Freewater RFD (subscription service)	foothills of Blue Mtns on east and southeast side	Both	20 volunteers & paid staff	4 - heavy brush Type 4 engines (1,000 gal water & ≥ 90 GPM) 3 - light brush Type 6 engines (200 gal & ≥ 80GPM) 2 - Tenders (2,250 gal & 300 GPM; 5,000 gal & 750 GPM)	Yes - 80% of radios
Oregon Dept. of Forestry - Pendleton	Pendleton Unit - NEO Forest Protection	Wildland	4 permanent 12 seasonal	5 – Type 6X engines (300-400 gal) 1 – Type 4X Tactical Tender (1600 gal)	Yes

Agency	Protection Area	Suppression Services	Employees	Engines Available	Programmable Radios
Pilot Rock RFD	City of PR and surrounding 342 sq. miles	Both	20 volunteers	1 - Type 1 engine/tender (3,000 gal) Class A Foam 1 - Type 1 engine (1,000 gal) CAFS 1 - Type 2 engine (900 gal) CAFS 1 - Type 3 engine (350 gal) Class A Foam 1 - 3,000 gal Tender 1 - Type 4 engine (200 gal)	Yes - Red Net; White Net; Fire Net
USFS Walla Walla RD	federal forest	Wildland	summer ~ 50 winter ~ 15	1 - Type 4 engine 3 - Type 6 engines 1 - Type 7 engines (patrols)	Yes - radios are ready to be 'cloned'
USFS North Fork John Day RD	federal forest	Wildland			
Walla Walla Fire District #4	residents in Mill Ck area thru individual contract up to 2 miles into Oregon	Structural	none	6 - Type 6 engines 3 - 2,000 gal tenders	Command vehicles can talk with WA-DNR & USFS, but not ODF

Appendix D: Umatilla County CWPP WUI Scoring Explanation Sheet

This page was prepared by Angie Johnson, Oregon Department of Forestry, to provide additional detail on the various categories used to rank the various WUI areas by the Steering Committee.

Category 1:
Likelihood of Fire Occurring

Based on Fire Occurrence Rate (FOR) per 1,000 acres.
Used fire history data from ODF, USFS, and BLM for last ten years (1994 - 2003).

Category 2:
Topographic Hazard

Slope and Aspect working together on landscape. For example, 0-25% slope on north aspect would be considered low hazard whereas, 50% slope on south/southwest aspect would be considered high hazard. GIS was used to calculate the raster files and reclassify the combination of slope hazard and aspect hazard to come up with topographic hazard.

Category 3:
Total Fuel Hazard Rating

Surface and Ladder Fuels working together on the landscape. For example, Fuel Group 3 with Crown Fuel 3 would be considered high hazard, whereas Fuel Group 1 with Crown Fuel 1 would be considered low hazard. GIS was used to calculate the raster files and reclassify the combination of surface fuel hazard and ladder fuel hazard and arrive at total fuel hazard.

Category 4:
Overall Fire Protection Capability Rating

Homesite Density (homes per 10 acres)		Check Appropriate Box Under Category
Low	0 - .9	☐
Moderate	1 - 5.0	☐
High	5.1+	☐

Other Risk Factors Present		
Low	< 1/3 present	☐
Moderate	1/3 - 2/3 present	☐
High	> 2/3 present	☐

Other risk factors: Transmission power lines, above ground distribution lines, power substations, active logging, construction, debris burning, slash burning, mining, dispersed camping, developed camping, off-road vehicle use, railroad, federal/state highway, county road, public access roads, camps/resorts/cabins/stables, schools, business, ranch/farm, lightning prone, dump, mowing dry grass, woodcutting, equipment use, flammables present….

Organized Response

Low	Both Structural and Wildland	☐
Moderate	Wildland response only	☐
High	No organized response	☐

Fire Response

Using outermost group of structures to determine response time. Response time also includes time it takes to bring in volunteers.

Low	< 10 minutes	☐
Moderate	> 10 minutes	☐
High	< 20 minutes	☐
Extreme	> 20 minutes	☐

Community Preparedness

Low	Organized group, CWPP, phone tree, mitigation efforts	☐
Moderate	Primarily agency efforts (mailings, campaigns, etc.	☐
High	No effort	☐

Structural Vulnerability

Ingress/Egress, All-Season Road Condition, Fire Service access, adequate water supply for structural firefighters, comfort level of structural fire district regarding defendability of structures in wildfire event.

Low	< 1/2 adequate	☐
High	> 1/2 inadequate	☐

Category 5:
Weather Hazard

Weather Factor of High has been applied by the State of Oregon for all of eastern, southern, and southwestern Oregon. The high hazard rating was offset by using annual precipitation. The layer used to determine annual rainfall came from the Oregon Dept. of Forestry GIS library.

Category 6:
Values at-risk

Values Protected

Community values like wildlife, recreation, viewshed, hunting/fishing, municipal watersheds, power substations and corridors, communication sites and facilities, transportation corridors, homes, life, etc.

High	Yes	☐
Low	No	☐

Appendix E: References

http://www.fireplan.gov/eports/351-358-en.pdf

http://www.nwfireplan.gov

http://www.fireplan.gov

http://www.fireplan.gov/reports/7-19-en.pdf

http://www.whitehouse.gov/infocus/healthyforests/toc.html

http://www.fema.gov/fima/planning10.shtm

http://www.odf.state.or.us/DIVISIONS/protection/fire_protection/prev/sb360/docs/overview.pdf

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[1] State of Oregon Emergency Management Plan, *Natural Hazards Mitigation Plan, Fire Chapter*, November 2003.

[2] http://www.communitiescommittee.org/pdfs/cwpphandbook.pdf

[3] Josephine County Integrated Fire Plan, August 2004.

[4] http://www.umatilla.nsn.us/geninfo.html

[5] http://www.wrh.noaa.gov/mfr/climo/AvgAnnPcpnOR.gif

[6] State of Oregon Emergency Management Plan, *Natural Hazards Mitigation Plan, Fire Chapter*, November 2003.

[7] This section is based upon *Methodology for Hazard Assessment (2005authored by Angie Johnson, Oregon Department of Forestry Northeast Oregon District, and edited by Trish Wallace, USDA Wallowa-Whitman National Forest.*

[8] Protecting People and Sustaining Resources in Fire-Adapted Ecosystems – A Cohesive Strategy, October 13, 2000.

[9] Fire Regime Condition Class Definition. 06/20/2003. Obtained from Umatilla National Forest Fire Planning.

[10] Expanded Fire Condition Class Definition Table. Available at http://www.frcc.gov.

11 *A Conceptual Approach for a Maintenance Strategy for Fuel Treatments in Oregon: Maintaining the Investment*, Fitzgerald, Stephen and Martin, Charlie, Oregon State FFHM Committee Report, July 5, 2004.

[12] http://egov.oregon.gov/ENERGY/RENEW/Biomass/use.shtml

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Appendix F: Acronyms and Glossary of Terms

BLM – Bureau of Land Management
CAR – communities at risk
CE – Category Exclusion
CSEPP – Chemical Stockpile Emergency Preparedness Program
CTUIR – Confederated Tribes of the Umatilla Indian Reservation
CWPP – Community Wildfire Protection Plan
EA – Environmental Assessment
EIS – Environmental Impact Statement
FEMA – Federal Emergency Management Agency
HFRA – Healthy Forests Restoration Act
NEPA – National Environment Protection Act
NEO – Northeast Oregon district (of Oregon Dept. of Forestry)
NFP – National Fire Plan
ODF – Oregon Department of Forestry
ORS – Oregon Revised Statute
OSFM – Office of State Fire Marshall
RFPD – Rural Fire Protection District
SB – Senate Bill (Oregon Legislature)
SFM – State Fire Marshall (more commonly Office of State Fire Marshall)
UNF – Umatilla National Forest
USFS – US Forest Service
WUI – Wildland-Urban Interface
WHZ – Wildfire Hazard Zone

Conflagration – in the context of this document, this means Governor-declared fires with an imminent threat to life or structures that have exhausted local and mutual aid resources.

Conflagration Act – state legal authority established as a civil defense measure to mobilize structural fire suppression resources for massive urban fires. It was first used in 1951 to coordinate aid to an explosion and fire in downtown Roseburg. The Act was not invoked again until 1972, when a wildland fire in Yamhill County threatened homes in what is now known as the wildland-urban interface. It must be authorized by the Governor. The Act includes authorization for OSFM to assign firefighting forces and equipment beyond mutual aid agreements. It also designates reimbursement for aid to those departments participating.

Driveway - the primary, privately owned vehicle access road that serves a dwelling, which is controlled by the owner of the dwelling, and which is longer than 150 feet.

Dwelling – a structure, or a part of the structure, that is used as a home, as a residence, or as a sleeping place by one or more people who maintain household in the structure.

Fire-resistant roofing – roofing material that has been installed and is maintained to the specifications of the manufacturer, and which is rated by Underwriter's Laboratory as Class A, Class B, Class C, or is equivalent thereto; or is metal.

Forestland – any woodland, brushland, timberland, grazing land or clearing that, during any time of the year, contains enough forest growth, slashing or vegetation to constitute, in judgment of the state forester, a fire hazard, regardless of how the land is zoned or taxed.

Fuel break – a natural or human-made area immediately adjacent to a structure or to a driveway, where material capacity of allowing a wildfire to spread does not exist or has been cleared, modified, or treated to significantly reduce the rate of spread and the intensity of an advancing wildfire; to create an area in which fire suppression operations may more safely occur.

Homeowner's association – a legal nonprofit corporation that manages a community of homes or residential properties.

Included rural lands – lands that meet the definition "rural" but which have been classified as "suburban".

Ladder fuel – branches, leaves, needles, and other combustible vegetation that may allow a wildfire to spread from lower growing vegetation to higher growing vegetation.

National Fire Plan – a federal program that helps manage the impact of wildfire on communities. It has five main components: firefighting, rehabilitation and restoration, hazardous fuel reduction, community assistance, and accountability. The state foresters have agreed upon a process for completing an assessment in 2003-04 for evaluating communities at risk to better prioritize funding of National Fire Plan projects.

NEO District – ODF district in Northeast Oregon comprised of four units: Union, Wallowa, Baker, and Pendleton. NEO District headquarters are located in La Grande.

Non-fire-resistant roofing – roofing material that is not resistant including, but not limited to, cedar shakes.

Non-statistical Fires – ODF fires, commonly referred to as 'non-stat' fires that ignited on non-State protected land but threatened ODF protected property.

Oregon Senate Bill 360 – this 1997 legislation established the policy and framework for meeting the fire protection needs of the wildland-urban interface. One of the goals of the bill is to define the Interface in Oregon and establish a process and system for the classification of the Interface. Formal classification committees in each county will accomplish the classification. Work has begun in Jackson and Deschutes counties, with the remainder of the state planned for classification over the next ten years. The

Northeast Oregon district of ODF has hired an employee to manage the SB360 work in the district.

Road – a road over which the public has a right of use.
Rural – a geographic area that has not been classified by a committee as suburban or urban and shall include:

- Lands zoned primarily for farm or forestry uses;
- Lands which have an average tax lot size of 10 acres or larger;
- Lands not zoned to allow a concentration of structures;
- Lands that do not contain a concentration of structures.

Safety zone – an area that is substantially free of flammable materials, and which can be used as a refuge to protect people from an advancing wildfire.

Standards – the actions, efforts, or measures which owners of suburban and urban lands shall take on their property, pr... to a wildfire occurrence which originates on the property.

Statistical Fires – ODF fires typically referred to as 'stat' fires. They are fires that ignited on State protected land.

Structure – a permanently sited building, a manufactured home, or a mobile home that is either a dwelling or an access building, which occupies at least 500 square feet of ground space, and which has at least one side that is fully covered.

Structural fire protection – the protection of structures by established municipal fire departments and rural fire protection districts with specific equipment and training.

Structural Ignitability – a term that relates to the cause of a home igniting during a wildfire. Examples are ratings given to the building materials used for the home and amount of combustible materials around the home.

Structural Vulnerability – a term that relates factors contributing to how and why a home is vulnerable to wildfire, including but not limited to, access to the home, ladder fuels and vegetation within the landscape of a home, and whether or not fire protection is available.

Suburban – a geographic area which includes one or more of the following:

- Lands where a concentration of structures exists;
- Lands on which current zoning allows a concentration of structures; or
- Included rural lands.

Urban – a geographic area that includes one or more of the following:

- Lands within a city limit; or
- Lands within an urban growth boundary.

Wildfire – an uncontrolled fire that is burning on forest and which is damaging, or is threatening to damage, forest resources or structures.

Wildfire Hazard Zone – the portion of a local government jurisdiction that has been determined to be at risk of a catastrophic wildfire. The purpose of such a designation is to define those areas where buildings need to be made more survivable from fires spreading from adjacent wildlands. The WHZ process was established by the 1993 Oregon Legislature. Participation by local governments is voluntary.

Wildland-Urban Interface (a.k.a. Wildland Interface, Forestland-Urban Interface, Interface) – an area where structures are adjacent to or are intermingled with natural vegetative fuels which is prone to the occurrence of wildland fires.

COOPERATIVE SERVICE AGREEMENT
ODF #13273 97300 497339 07
UCEM #ODF-2006-01

Between

OREGON DEPARTMENT OF FORESTRY
NORTHEAST OREGON DISTRICT
AND
UMATILLA COUNTY EMERGENCY MANAGEMENT

PROJECT AND FINANCIAL PLAN

I. Introduction

The Oregon Department of Forestry (ODF), Northeast Oregon District and the Umatilla County Emergency Management are actively involved in cooperative endeavors related to fire emergency planning in order to benefit overall public welfare in Umatilla County. To effectively implement this activity, a need exists to cooperatively share resources. The purpose of this cooperative agreement is to document the arrangement regarding the financial and procedural aspects of employing Angie Johnson to write and assist in the creation of the West Umatilla County Community Wildfire Protection Plan.

II. Scope and Duration

ODF shall enter into a cooperative agreement with UCEM for a period of up to 18 months to utilize Angie Johnson to help create and write the West Umatilla County Community Wildfire Protection Plan (CWPP). Umatilla Emergency Management (UBWC) will provide overall direction and coordination of the process. The Steering Community for the CWPP will provide localized direction and input to the development of the plan.

III. Principal Contacts

The principal contacts for each agency for the administration of the project are:

David King
Pendleton Unit Forester
Oregon Department of Forestry
1055 Airport Road
Pendleton, OR 97801
541-276-3491

Ray Denny
Emergency Management Coordinator
Umatilla County
4700 NW Pioneer Place
Pendleton, OR 97801
541-966-3705

IV. Detailed Project Description

ODF will provide:

1. Day to day supervision
2. Technical direction for the development of the CWPP.
3. ODF computer access, work space, and direct office services such as photocopying as they relate to this project.

UCEM will provide:

1. Reimbursement to ODF for Angie Johnson's time at an hourly rate of up to $21.44 per hour up to a maximum for this project of $18,567 ($21.44/hour inc. OPE x 866 hours).
2. Reimbursement to ODF for administrative costs such as, but not limited to vehicle mileage and administrative support up to a maximum of $3,556 (1200 miles @ $.63=$756; Admin., supplies; GIS materials, printing costs, etc. estimated at $2,800).

V. Supervision and Technical Oversight

Administrative oversight of the employee shall be the responsibility of ODF.

Technical oversight of the employee as it relates to the writing and development of the plan shall be the responsibility of UCEM.

Normal work will be within an 8:00 am to 5:00 pm workday. However, the actual hours worked may require some evening and weekend meetings. Fire emergencies and other ODF work related duties may take precedence over the work covered in this agreement.

Either party may terminate this agreement by giving 15 days' notice to the other in writing. All work under this agreement shall immediately cease upon such notice.

To the extent permitted by Article XI, Section 7 of the Oregon Constitution and by the Oregon Tort Claims Act, ODF shall indemnify County against any liability for damage to life or property arising from ODF's actions under this Agreement provided, however, ODF shall not be required to indemnify County for any such liability arising out of the wrongful acts of employees or agents of County.

To the extent permitted by Article XI, Section 7 of the Oregon Constitution and by the Oregon Tort Claims Act, County agrees to be responsible, assume liability and indemnify ODF for County's own wrongful or negligent acts of omissions, or those of its officers, agents or employees.

VI. Reimbursement

UCEM shall provide for the reimbursement of actual costs incurred by ODF for the creation and writing of the West Umatilla County CWPP up to a maximum of $22,123 for this project as shown in the financial plan. All billings shall contain the agreement numbers, Billings will be completed on either a monthly or bi-monthly basis, as determined jointly by the agency representatives. Itemized documentation in support of all expenses is required. ODF billings for the project shall be sent to the following location:

Umatilla Co. Emergency Management
Attn: Ray Denny
4700 NW Pioneer Place
Pendleton, OR 97801

VII. Financial Plan

Salary:	$ 18,567
Vehicle Mileage	$ 756
Admin., Misc. Supplies	$ 2,800
Project Total:	$ 22,123

VIII. This agreement is effective July 1, 2006 and will terminate on December 31st, 2007, unless extended.

Dennis D. Doherty 7-14-06

DENNIS D. DOHERTY Date
Chair, Board of Commissioners
Umatilla County

8/1/06

JOHN BUCKMAN Date
District Forester, Northeast Oregon District
Oregon Department of Forestry

BOARD OF COMMISSIONERS UMATILLA COUNTY STATE OF OREGON

073109009

THE BOARD OF COMMISSIONERS OF UMATILLA COUNTY

STATE OF OREGON

In the Matter of Adoption of West Umatilla County Wildfire Protection Plan	)))	Order No. BCC2009-045

WHEREAS a wildfire protection plan is part of emergency planning for a community to promote wildfire awareness, for fire prevention through identification and reduction of hazardous fuels, and for cooperative emergency fire response;

WHEREAS on June 16, 2005, Umatilla County endorsed the Umatilla County Community Wildfire Protection Plan as a planning tool to provide a framework for wildfire suppression and protection services to assess risk and hazards and identify strategies for reducing those risks;

WHEREAS the Umatilla County Community Wildfire Protection Plan focused on the portion of the county located East of Highways 11 and 395, and South of Highway 73/County Road No. 1400 (Butter Creek Road) (excluding the northern edge in the Mill Creek watershed), identified as Blue Mountains - Foothills Region;

WHEREAS on February 8, 2006, the community wildfire protection plan for the Mill Creek watershed area was created, entitled Mill Creek Community Wildfire Protection Plan, for both the Oregon and Washington portions of the watershed;

WHEREAS the creation of a wildlife plan to address the remainder of Umatilla County, identified as West Umatilla County, was initiated in 2006;

WHEREAS with the coordination of the Oregon Department of Forestry Northeast Oregon District, the development of the plan has been drafted by Umatilla County staff, public agencies and community members, to reduce the wildfire risk within the western part of Umatilla County;

WHEREAS the community wildfire protection plans for the county are part of the Umatilla County Natural Hazards Mitigation Plan adopted by the Board of Commissioners on June 30, 2009.

NOW THEREFORE, IT IS ORDERED THAT:

1. The Board of Commissioners adopts the West Umatilla County Community Wildfire Protection Plan, a copy of which is attached to this order and incorporated by this reference, as an official plan for Umatilla County.

2. The West Umatilla County Community Wildfire Protection Plan is made an addendum to Umatilla County Community Wildfire Protection Plan dated June 16, 2005, and is made part of the Umatilla County Natural Hazards Mitigation Plan via its Appendix B.

DATED this 22nd day of July, 2009.

UMATILLA COUNTY BOARD OF COMMISSIONERS

W. Lawrence Givens, Chair

Dennis D. Doherty, Commissioner

ABSENT

William S. Hansell, Commissioner

ATTEST:
OFFICE OF COUNTY RECORDS

Records Officer

West Umatilla County Community Wildfire Protection Plan

WORKING DOCUMENT – July 22, 2009

Valuing the protection of Wildland-Urban Interface Areas and associated Communities-at-Risk across Umatilla County

I. Introduction

Executive Summary

Through the initiative of the Oregon Department of Forestry, the Umatilla County Commissioners has tasked a committee of local, state, and federal wildfire agencies, along with land managers and private citizens, with creating a Community Wildfire Protection Plan (CWPP). Existing fire protection resources and programs have been reviewed. Communities have been identified that are at a higher risk from a wildfire event, project areas have been designated and prioritized, and strategies developed to achieve the goals of the CWPP. Prevention education involving citizens and stakeholders has begun. This working document will serve as an informational resource that will enhance community safety through hazard and risk reductionin the wildland-urban interface in what is known as the West Umatilla County Planning area. This document is an addendum to the Umatilla County- Foothills/Blue Mountains Region CWPP. All background information related to the planning process and policies that influence the development of this document can be found in the Umatilla County – Foothills/Blue Mountains Region document.

CWPP Partners

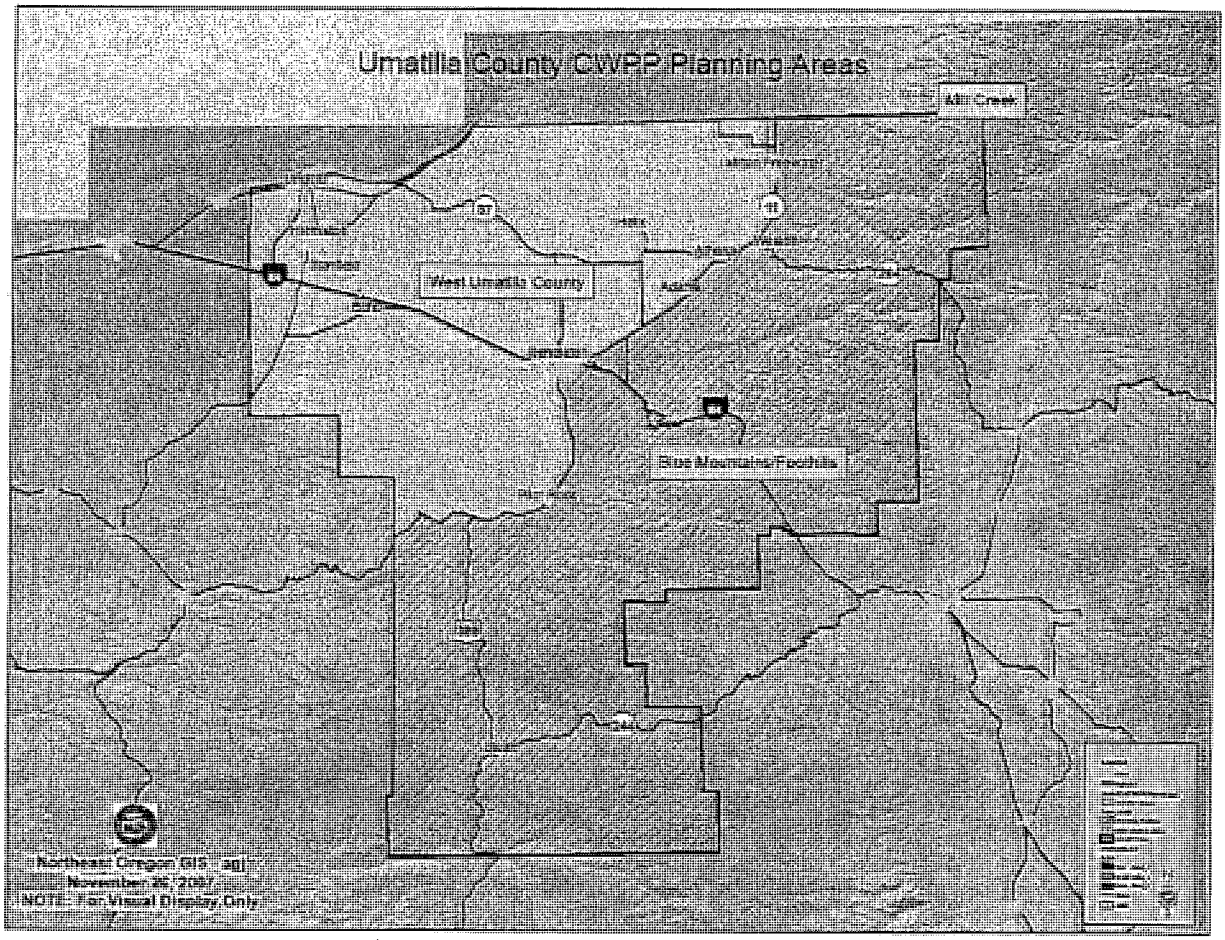
The development of the West Umatilla County CWPP relies upon the collaboration of multiple agencies and organizations working together to define common goals and objectives. ODF obtained project funding through a Umatilla County Title III allocation. Once this funding was secured, letters were sent to various fire services cooperators and interested citizens, inviting them to participate in the planning process. Members of the steering committee and other resource advisors include:

- *Angie Johnson, Oregon Department of Forestry (ODF)- Facilitator*
- *BJ Workman, Umatilla County Emergency Management/CSEPP – Administrative Support*

- Ray Denny, Umatilla County Emergency Manager
- JR Cook, Planning Department
- Cliff Bracher, Landowner, Bracher Farms
- T. Spratling, Manager, Cunningham Sheep
- Tammy Dennee, Oregon Wheatgrowers Association
- John Fowler, City of Pendleton Fire Chief
- Larry Givens, Umatilla County Commissioners and Landowner
- Shane Garner, City of Milton-Freewater Fire Chief
- Merle Gehrke, Echo Fire Chief
- Tom Groat, Confederated Tribes of the Umatilla Emergency Management
- Scott Stanton, Pilot Rock Rural Fire Protection District Chief

Forest and is adjacent to the Wehana-Tucannon Wilderness area. This area is covered under the Mill Creek Watershed CWPP. See Figure 1.

Figure 1 - Umatilla County CWPP Planning Areas



Fire Districts and Unprotected Areas

Several agencies provide structural fire protection within the CWPP project area for all, or portions of, five incorporated municipalities (Ukiah, Pilot Rock, Pendleton, Weston, and Milton-Freewater). In addition to Forest Service and ODF, wildland fire protection is offered through several rural fire districts (RFD) as outlined below. All organizations and agencies operate under mutual aid agreements with ODF for additional wildland fire protection.

- The cities of Pendleton and Milton-Freewater have city-operated fire departments that provide structural protection inside their respective city limits. The Pendleton Fire Department also has contracted with three rural fire districts outside city limits to provide protection services; McKay Dam RFD, Lower McKay RFD and Riverside RFD are all tax-based fire districts within five miles of Pendleton. The Hermiston FD, Stanfield RFD, Echo RFD, Umatilla RFD, and Helix RFD all provide structural protection inside their respective cities as well as the areas within their District boundaries.

- The City of Athena has an all-volunteer, city-operated fire department.

- Pilot Rock RFD is a volunteer department that provides fire suppression for the City of Pilot Rock (population 1,540) and the surrounding 342 square miles. Difficult terrain with limited road access, and well as limited labor resources during daytime hours provide unique challenges. Boundaries are adjacent to ODF protected lands as well as the Umatilla Indian Reservation.

- Another recognized rural fire district provides multiple services inside the project boundary. East Umatilla RFPD has both paid staff and volunteer members, and has three stations in its protection area. Services are provided to the cities of Adams and Weston, as well as to residents along Highway 204 on Weston Mountain. This WUI area has a high density of year-round dwellings and seasonal cabins, and is a major recreational destination in the Blue Mountains area.

- The Umatilla Indian Reservation has structural protection through the CTUIR Fire Department and wildfire protection through the Bureau of Indian Affairs (BIA). Both agencies are stationed out of Mission, an unincorporated town on the reservation, eight miles east of Pendleton.

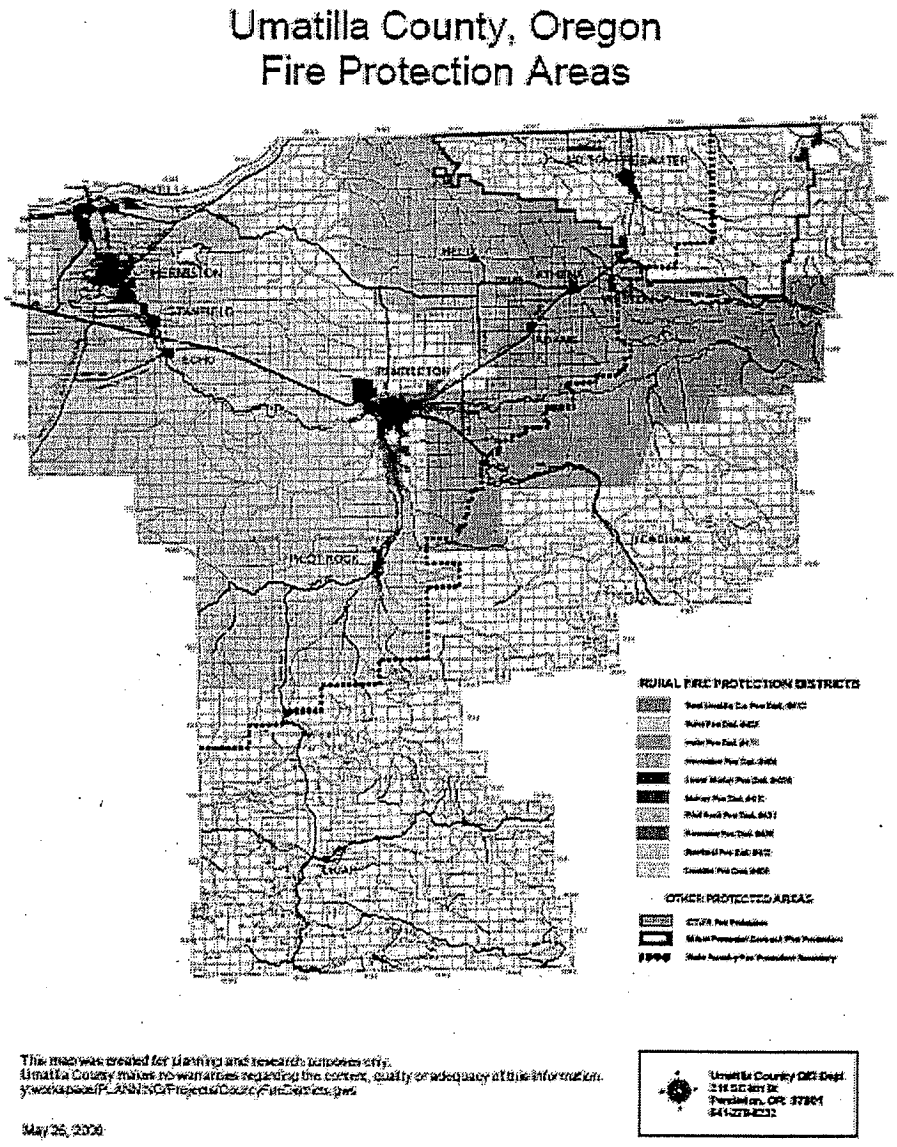
- Subscription service is offered in the northern end of the County through Milton-Freewater Rural Fire Department.

- Walla Walla County Fire District #4 provides structural fireprotection to Oregon residents in the Mill Creek and Umapine areas through individual contracts. They provide service about two miles into Oregon (on County Road 582), but will go further up if requested under mutual aid.

- The BLM contracts with the USFS-Umatilla National Forest for protection in Juniper Canyon. The US Fish and Wildlife Service provides wildland fire protection on their refuges (Cold Springs, McKay Creek, and McNary). Oregon Department of Forestry does not provide protection for private landowners in the true western side of Umatilla County.

The lack of forestland in western Umatilla County results in private land unprotected by ODF. Whatever land that is not protected by rural or city structural fire districts is considered unprotected, including remote areas such as Holdman, Juniper Canyon, and Butter Creek. It is the goal of ODF to promote formation of Rangeland Protection Associations. More information regarding Rangeland Protection Associations can be found in Section VI.

Figure 2 – Umatilla County Protection Districts



II. Mission and Goals

Mission Statement: To create a West Umatilla County Community Wildfire Protection Plan that is consistent and coordinated with the Umatilla County- Blue Mountains and Foothills Region Community Wildfire Protection Plan.

Goals & Statements:

- Promote wildfire awareness and target fire prevention and safety information across at-risk communities:
  - Coordinate community meetings to discuss fire related concerns with landowners
  - Distribute information on Farm and Ranch Fire Safety

- Promote cooperative emergency fire response for the protection of life, property, and natural resources:
  - Identify resource equipment inventory, training needs and level of protection of participating fire agencies through annual reviews
  - Review interagency communications and suppression strategies for emergency fire response situations
  - Encourage formation of Rangeland Protection Associations in unprotected areas

- Identify and reduce hazardous fuels and coordinate risk reduction strategies across the landscape:
  - Develop and utilize a common set of base information for risk assessment
  - Promote landowner assistance programs
  - Gather local and community knowledge of fire related concerns through public outreach
  - Prioritize fuel reduction areas and projects
  - Utilize treatment types that also maintain, enhance, and protect wildlife habitat, aesthetic and recreational values

- Conduct annual monitoring and evaluation of plan progress
  - Review goals and update plan as needed or as new information becomes available

III. West Umatilla County Profile

Communities

West Umatilla County consists of lands devoted to agriculture. Wheat, corn, and potatoes are the primary crops raised in western Umatilla County. The communities across the area consist of city centers and then scattered farms and ranches branching out from the city. The cities and communities identified are:

Incorporated Cities

- Pendleton
- Stanfield
- Echo
- Hermiston
- Helix
- Adams
- Athena
- Milton-Freewater
- Umatilla
- Pilot Rock

Other Communities

- Holdman
- Juniper Canyon
- Cold Springs
- Riverside
- McKay
- Hat Rock
- South Shore
- West Hills outside Pilot Rock
- Butter Creek
- West Hills/Golf Course area outside of Milton-Freewater
- Umatilla Depot
- Reith
- Umapine
- Mission (included in this plan– was missed in the Blue Mountains/Foothills CWPP)

IV. Risk Assessment

West Umatilla County Wildfire Hazard Assessment

To identify and prioritize wildland-urban interface areas-at-risk in West Umatilla County, an assessment of factors was conducted; these factors contribute to large wildfire events that can leave communities vulnerable. The data was derived from the statewide hazard assessment conducted in 2005. This section will outline the process used and highlight unfamiliar definitions. Three key guidance documents were referenced in the assessmentof communities-at-risk and the wildland-urban interface areas:

1. *Field Guidance: Identifying and Prioritizing Communities at Risk* National Association of State Foresters. June 27, 2003. (Available at: http://www.stateforesters.org/)
2. *Concept for Identifying and Assessment of Communities at Risk in Oregon.* Draft prepared by Jim Wolf, Fire Behavior Analyst, Oregon Department of Forestry. July 19, 2004.
3. *WildlandUrban Interface Communities-at-Risk Program, Final Mitigation Recommendations.* Reports provided for BLM by Dynamac Corporation, 2002.

In West Umatilla County, a ***community-at-risk (CAR)*** is defined as a group of homes or other structures with basic infrastructure (such as shared transportation routes) and services that may be near federal land. A ***wildland-urban interface (WUI)*** area surrounds a community-at-risk, including that community's infrastructure or water source, and may extend 1 ½ miles or more beyond that community. This boundary depends on topography and geographic features that could influence wildfire, the location of an effective firebreak, or Condition Class 3 lands.

It is important to understand the meaning of risk and hazard in relation to wildfire. ***Risk*** is the chance or probability of occurrence of fire. ***Hazard*** is the exposure to risk; in a wildfire situation, those hazards can be related to either the natural or the man-made environment. Natural hazards include fuel type and amount of fuels, topography, and weather. Man-made hazards include the limited availability of water, limited access to structures, limited green space around structures, and the ignitability of structures. The capability of firefighting resources will be compromised by the severity of both natural and man-made hazards.

Fire Occurrence/Risk of Ignition

The rate of fire occurrence is an important component of the assessment. Historical fire records were used for a ten year period (1996-2005). Data was

compiled by ODF. The fire occurrence rate (FOR) per 1,000 acres was used to yield a statistical analysis of the project area. The number of fires for the past ten years for the State of Oregon was determined in order to calculate fire occurrence per 1,000 acres. A fire occurrence rate determined by the hazard assessment conducted statewide was calculated for each WUI and a value was assigned to determine risk. This value was also used to assist in prioritization of WUI areas within West Umatilla County.

Fuels / Vegetation

Data used to determine fuel hazard was derived from the State of Oregon Hazard Assessment conducted in 2005. For West Umatilla County, the increased risk of a large wildfire event is caused by the buildup of flashy fuels and changes in vegetation composition over time. A value was assigned to determine hazard level for each WUI.

Topographic Hazard

Slope and aspect affect both the intensity and rate of spread of a wildfire. The topography factor was derived from the Digital Elevation Model for Umatilla County. A value was assigned to each WUI to determine hazard.

Weather Hazard

In western Umatilla County, weather patterns can produce summer lightning storms that start many fires. These multiple starts can put a strain on the firefighting resources in the western part of the county. With the drying of fuels over time and the low relative humidity factored in, the probability for large fires can significantly increase during these lightning events. The number of days per season that fuels are capable of producing a significant fire event is also important to consider. Data provided by Oregon Department of Forestry that supports a hazard rating for weather is associated with a factor for eastern Oregon, which received the highest hazard rating for weather. This high hazard value was assigned by an analysis of daily wildfire danger rating indices in each regulated use area of the state. This assigned value is constant across all WUI areas in western Umatilla County.

Overall Fire Protection Capability Hazards (Structural Vulnerability)

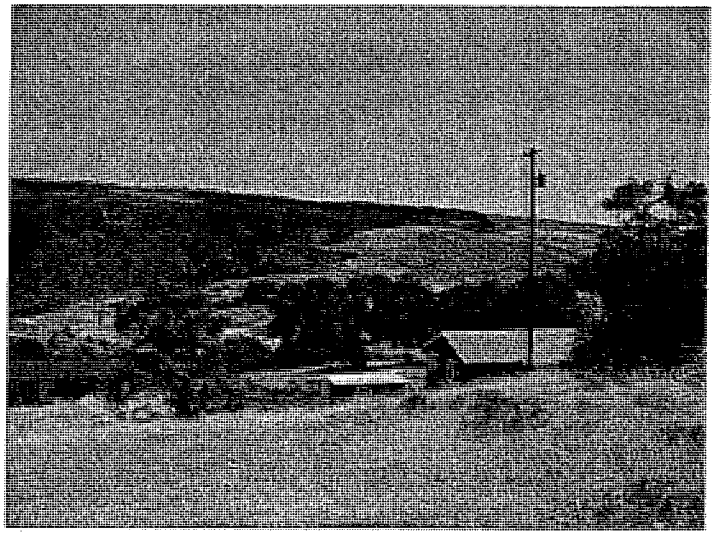


Figure 1 - Homes in WUI

The western Umatilla County structural fire community supports a county fire defense board chief to make decisions related to overall structural fire response. An assessment of each structural fire protection district was conducted either by the chief of the associated district or the county fire defense board chief. Consideration was given to the level of training/equipment/preparedness of firefighting resources, type of access to homes, density of structures, availability of water sources, community preparedness, and structural vulnerability. A value was assigned to each WUI area.

Values At-Risk

This category was based on public input collected during community meetings and comments received from informational questionnaires. Steering committee members provided input based on their local experience and knowledge of the areas as well.

Values at-risk are an important, but highly subjective component of the assessment. Values lost because of a devastating wildfire affect residents in different ways. West Umatilla County's economy is impacted when large wildfires eliminate valuable rangeland for grazing and wildlife habitat, which affects landowners and local businesses. Social values-at-risk include home and property, wildlife, recreation, and cultural and historical sites. In addition, loss of human life and loss of homes could be overwhelming for families, destroying the fabric of the close-knit, small-town atmosphere residents of West Umatilla County cherish about their communities.

Ecologically, general wildlife habitat and diversity, as well as threatened and endangered species of fish, wildlife, and plant life could be wiped out or severely harmed in the long-term, depending on the intensity of the wildfire, leaving behind by the following spring a sprouting of invasive and noxious weeds. Water quality could be impacted if a moderate to high intensity wildfire burned through watersheds, affecting the health of fish and wildlife as well as domestic water supplies for residents.

Using the Hazard Assessment to Score WUI Areas

The West Umatilla County CWPP Committee identified communities-at-risk across the landscape using several factors. As previously defined, this could mean a group of homes or structures with basic infrastructure and servicesthat may be near federal land. The next step was to designate WUI boundaries that would incorporate those communities-at-risk as appropriate by using assessment information (previously described). The hazard assessment information was used to develop a scoring matrix that would provide results used for prioritizing the WUI areas within western Umatilla County (see Table 1).

The weighting of each element of the matrix was based on input received from the community, members of the steering committee, and information derived from the statewide assessment and scoring, and was not scientifically proven in any way. A statistician was not involved in the process, as this was meant to be community-driven, with input captured in its raw form by the community and the committee involved with its development. The information used to arrive at a score is in no way considered scientific statistical analysis. The scores are approximate and representative of group consensus.

The list of priorities helped the committee build an inventory of projects and action items that could be implemented to protect the WUI areas from large wildfire. A more complete explanation of each category is found in the appendices of this plan. An aggregate score of 23 points was establishedas the overall high score. See Table 1 on next page.

Table 1. Scoring Matrix - Factors Used for Ranking West Umatilla County WUI Areas

Rating Factors for Communities-at-Risk	Point Breakdown
Likelihood of Fire Occurring (historical fire starts data from BLM; based on occurrence rate per 1,000 acres)	1 pt – low occurrence 2 pts – moderate occurrence 3 pts – high occurrence
Topographic Hazard (slope and aspect combined)	1 pt – 0% - 25% 3 pts – 25% - 40% 5 pts – more than 40%
Total Fuel Hazard (surface and crown fuels combined)	1 pt – low hazard 3 pts – moderate hazard 5 pts – high hazard
Overall Fire Protection Capability (equipment, training, preparedness, access to homes, structure density, etc.)	1 pt – low capability 3 pts – moderate capability 5 pts – high capability
Weather Factor (all of Umatilla County received a high value of 3)	3 pts - high
Values at Risk (taken from surveys and public input; major infrastructure, municipal water source, utility lines/pipelines, etc.)	2 pts – high 1 pt – low
Total Points Possible = 23	

V. Mitigation Action Plan

Prioritization of WUI Areas in West Umatilla County

The WUI boundaries were drawn to capture the overall limitations of each fire protection district, fuel hazard, CAR's, and values-at-risk. Logical anchor points on the landscape were used to designate WUI boundaries, including natural fuel breaks, ridgelines, and roads. Local knowledge and public input was also part of the decision process for determining WUI boundaries.

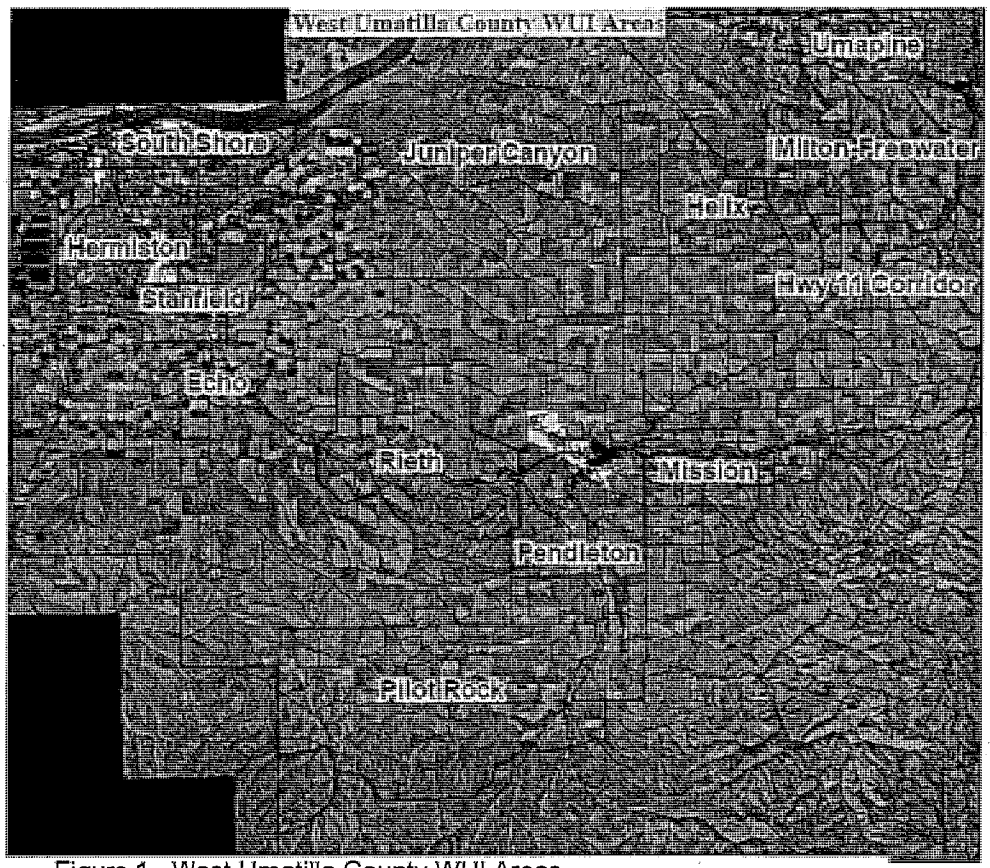


Figure 1 - West Umatilla County WUI Areas

Fourteen WUI areas were identified for West Umatilla County. Based on the total points scored, each WUI was ranked with an adjective rating of High or Moderate Priority. This ranking will be used to establish funding for potential mitigation projects. It will also assist the county with planning needed to address additional concerns, like developing rules and policies associated with mitigation of large wildfire and protection of property.

Table 2 – WUI Areas in West Umatilla County, by Priority.

Priority Level	WUI Name	Total Score
High	Juniper Canyon	21
	Pendleton	19
	Stanfield	19
	South Shore	18
	Echo	18
	Riith	18
	Hermiston	17
	Helix	17
	Mission	17
	Pilot Rock	17
	Milton-Freewater	17
Moderate	Umatilla Depot	15
	Umapine	14
	Highway 11 Corridor	14

Mitigation Strategies

The inventory of projects and action items that could be implemented to protect WUI areas in West Umatilla County is not all-inclusive. Community members who have other ideas to help protect their specific community can contact one of the committee members at any time. Communities are encouraged to use this information to improve upon the strategies listed. All projects are listed by category.

The categories are Education, Fuels Treatment, or Emergency Preparedness. Education projects are those related to fire prevention or collaboration/awareness on a particular issue related to this CWPP. Fuels treatment projects are those related to treating fuels on the landscape or creating defensible space around homes. Emergency Preparedness projects are those related to emergency response in a wildfire event, either pre-suppression or suppression. Strategy Sheets for each WUI are located in the Appendices of this Plan.

Education

Education comes in the form of delivery of fire prevention information to the public during community events, debris clean-up days, and signing during fire season. The best approach is for agency personnel to outreach to the public where they are; however, use of local media outlets is also encouraged.

Fuels Treatment

The following is a list of the type of treatment that would be appropriate for the rangeland in West Umatilla County:

1. Grazing
2. Mowing
3. Plowing

4. Irrigation
5. Controlled burning
6. Re-seeding to natural vegetation

Land management agencies and organizations have specific information related to effective use of treatment types mentioned in the list above. Landowners are encouraged to collaborate with agencies like Farm Services and NRCS where necessary to protect the larger landscape. This will achieve optimum results and stretch limited grant or tax dollars as far as they can go. When trying to achieve the goal of reducing fuels to modify fire behavior, other issues related to erosion, grazing needs, and weed infestation need to be addressed.

Emergency Preparedness

The primary focus of the public safety portion of this fire plan is to protect lives, private property and key values from wildfire. As part of this public safety mission, there is a partnership formed between private property owners and businesses, non-profit organizations, county, state and federal agencies to increase the likelihood of homes, businesses and other developed properties to survive a nearby wildfire.

Home Site Access

Consider how you access your home. Fire suppression forces will always consider if accessing your home puts them at risk during fire suppression work. Firefighters may utilize structural fire fighting equipment, engines, brush rigs or tenders to protect homes from fire. These vehicles require more space to turn around in than cars and pickups.

Having an adequate and safe area for firefighters to work around your home is a factor of access. Issues like the grade of the road, surface material, length, available turn-outs or turn-a-rounds are essential considerations when looking at protecting homes. Overgrown roadside vegetation could become a flame front, trapping firefighters. Above ground utility lines running along your access may also become a hazard. Clearly marked rural address numbers at the start of your access greatly aids fire suppression efforts. *Remember*, firefighters may be working during darkness to protect your home.

Evacuation

When a wildfire threatens a community our collective first priority is to protect life. The useful technique is to recommend people to move outof harm's way. Evacuation is simply a tool used to protect life during a hazardous/unpredictable event. By removing the threat to life from an area, firefighters can avoid the split focus of worrying about people in the hazard area as they work to suppressthe fire and protect property.

One of the necessary accompaniments with evacuations will be traffic control points established around the perimeter of the incident. Evacuations seek to remove the threat to life by displacing people out of the hazard area Traffic control points are necessary to prevent people from getting back into the hazard area until it is determined safe to do so. It is critical that you obtain credible information and follow the directions given.

A community that maintains defensible space around their homes may significantly reduce the need to evacuate the community. And the defensible space likely will increase the survivability of the home. When necessary during evacuations, communities will be advised of locations opened as shelters to provide cover, food and information to those displaced by a wildfire. The American Red Cross (ARC) has a national mandate to provide these services and locally the ARC is integrated into Umatilla County's emergency plan. The ARC also supports evacuees in obtaining emergency prescription medications and serving as a conduit for health or welfare messages between evacuees and family/friends. The Umatilla County Sheriff's Office will be the lead agency in protecting property within evacuated areas and in establishing traffic control points related to wildfire.

Re-Entry

The incident commander of the agency with jurisdiction during a wildfire event will determine under what conditions re-entry into evacuated areas will occur, on a case-by-case basis.

Shelter in Place[1]

If you cannot evacuate your home when a fire approaches, then:

- Shut off liquefied petroleum gas (LPG) or natural gas valves.
- Move furniture away from windows and sliding glass doors to keep it from igniting from the heat of fire radiating through windows.
- Remove your curtains or drapes. If you have metal blinds or special fire resistant window coverings, close them to block heat radiation.
- Stay inside your house, away from outside walls.
- Close all doors, but leave them unlocked.
- Keep your entire family together and remain calm.
- Remember: If it gets hot in the house, it is many times hotter and more dangerous outside.

[1] **Take Responsibility: Be Prepared if a Wildfire Occurs Brochure** -Cooperative Wildfire Prevention Program by the Burns Interagency Fire Zone, Burns BLM.

After the fire passes:

- Check the roof immediately, extinguishing all sparks and embers. If you must climb onto the roof, use caution, especially if it is wet.
- Check your yard for burning woodpiles, trees, fence posts or other materials.
- Keep the doors and windows closed.
- Continue rechecking your home and yard for burning embers for at least 12 hours.

VI. Community Outreach and Education

CWPP Public Meetings and Questionnaire Results

The CWPP relies on input from citizens and communities about what they perceive to be most at risk from a wildfire event and what they value most about their surroundings. A series of eight public meetings were held across West Umatilla County during November/December 2007 and June 2008. The purpose was two-fold: first, to inform interested citizens of the planning effort covering the WUI areas of the County, and second, togather information from the local knowledge base about the risks of wildfire events specific to their communities. These meetings were helpful in identifying the values and resources that the communities and residents felt were most at risk and in need ofprotection from wildfire.

Information about the CWPP project and upcoming meetings was distributed across the region. An informational brochure was created providing background and local project information; a public meeting flyer was designed listing dates and locations. Over 100 brochures and meeting notices were distributed to local agencies, businesses, and community gathering places such as grocery stores, hardware stores, city halls, and post offices. Information was also posted on the ODF website.

Each public meeting included a PowerPoint presentation followed by discussion and a question and answer session. Various members of the Steering Committee attended each meeting, along with private citizens interested in the effort. The attendance by the public was very limited.

Common themes presented themselves in the questionnaires returned. Many citizens do not see themselves at a tremendous risk to large wildfire. However, those that have been impacted in the past bywildfire were more than interested in improving protection from wildfire. Those that did respond to the questionnaires identified many values at risk as well, includingwildlife habitat and agriculture. Other values at risk identified during public discussions and results from the questionnaire are –

- Homes
- Hunting/Fishing
- Oregon Trail Sites
- Livestock
- Transportation Corridors
- Life
- Power Lines
- Hay Loss
- Neighborhood/Community
- Rangeland Health
- Businesses/Schools
- Family
- Way of Life
- Air Quality
- Communication Sites
- Other Infrastructure
- Farm Buildings
- Airport

Structural fire chiefs that responded to their questionnaire identified many issues that impact response time during a wildfire event. Due to the size of many districts in West Umatilla County, getting to a home in a timely manner impacts how fire departments can best deliver service. Other issues raised related to improving structural fire response are–

- House identifiers in poor locations or non-existent
- Flashy grass fuels contribute to large fire spread, limiting the amount of time an engine can get to the fire
- Limited water supply
- Structural fire departments exist for incorporated cities; some rural structural fire districts
- Misunderstanding among citizens – any fire truck leads them to believe that agency responding can attend to a structure fire.
- Remote, scattered locations of communities– no fire protection available or very limited wildland fire protection
- Volunteers for the Rural Fire Protection Districts are desperately needed

Fire Prevention

Living with Fire

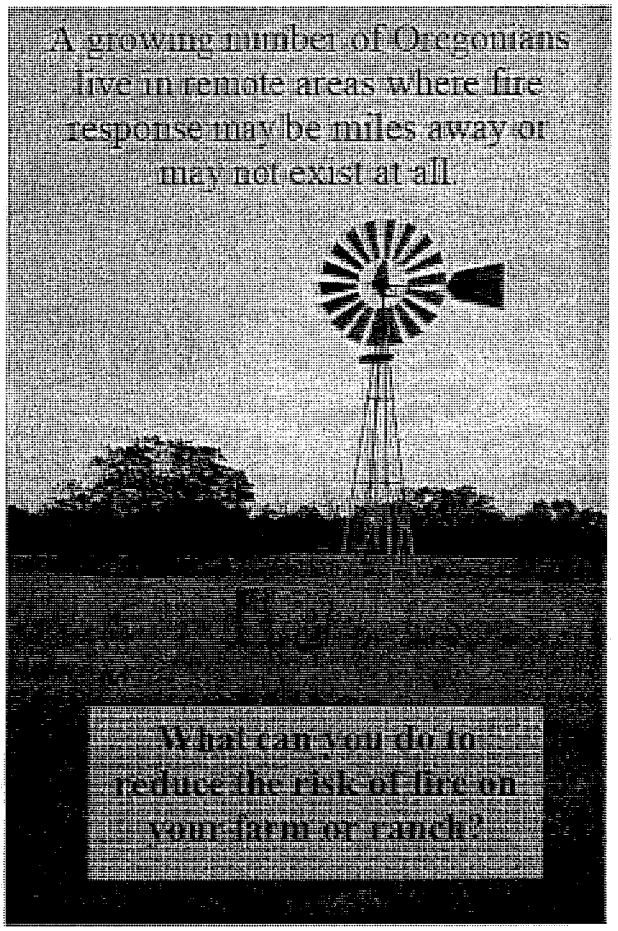
This national prevention program guides homeowners step-by-step through the process of eliminating hazards around their home. This newspaper publication shows how to create survivable space around your home, taking into account the topography and vegetation that surrounds it. The newspaper is available locally through ODF or on-line at http://pnwfireprevention.com/prevention/living

Firewise

This is a program developed by the National Fire Protection Association (NFPA) and features templates to help communities reduce risk and protect property from the dangers of wildland fires. Along with an interactive and resource-filled website full of free materials, the program offers training throughout the nation. Many Firewise workshops have been held across northeast Oregon where citizens and local agencies participated. For information concerning the Firewise program, visit online at http://www.firewise.org.

Farm and Ranch Fire Safety

This prevention tool was developed by the Rangeland Protection Association, BLM, and Oregon Department of Forestry. This tool can be distributed to cities, the county planning department, and fire districts for use in prevention programs. A copy of the information can be obtained by contacting ODF, Northeast Oregon District, at (541) 963-3168 or the Rangeland Protection Coordinator for ODF, Eastern Oregon Area, at (541) 447-5658. Or, you may refer to the copy in the Appendices of this plan.



Fire-Resistant Plants for Oregon Home Landscapes

The OSU Extension Service in Redmond has developed a pamphlet suggesting specific types of vegetation that may reduce wildfire risk around the home. Most people landscape their property with aesthetics in mind, not thinking about whether a plant or shrub material is flammable and could actually increase the risk around their home. This brochure describes the different plant materials that homeowners can use for landscaping that will complement their home while improving the chances of their home surviving a wildfire. Brochures have been distributed at public meetings and are available at the ODF office or through the OSU Extension Service office in Redmond. Visit their online site at http://www.extension.oregonstate.edu/emergency/FireResPlants.pdf

Fire-resistant plants are plants that don't readily ignite from a flame or other ignition sources. Although fire-resistant plants can be damaged or even killed by fire, their foliage and stems don't contribute significantly to the fuel and, therefore, the fire's intensity.

Rangeland Fire Protection Associations (RFPA) (Insert Logo)

An RFPA is setup as a non-profit corporation to prevent and suppress range fires. This is an opportunity for local landowners to protect their own and their neighbor's property where no fire protection services are currently available. RFPA's operate under the concept of "neighbors helping neighbors." For more information, contact the Rangeland Coordinator, ODF-Eastern Oregon Area, at (541) 447-5658.

Fuels Treatment Opportunities

A healthy rangeland is the best defense against large wildfire. Landowners are encouraged to work with specialists from Farm Services or NRCS on ways to improve rangeland health that will also lead to mitigating the detrimental effects of large wildfire. Not only could those agencies assist landowners in determining the best way to return the landscape to natural vegetation following a wildfire, they can also assist in treating invasive weeds. NRCS may be able to offer cost share assistance through their conservation programgeared toward promoting a more fire-adaptive ecosystem. Check with NRCS at http://www.or.nrcs.usda.gov/ or call (541) 278-8049.

VII. Monitoring and Evaluation

Schedule

The maintenance for this plan will be directed by theUmatilla County Commissioners, and coordinated with the core committee members of the represented agencies. The committee that put this plan togetherwill be best fit for evaluating how goals and objectives are being accomplished as set forth in this plan.

Proposed CWPP plan maintenance will be set annually to review the plan, reevaluate priorities for action items and progress, with a comprehensive revision set for every five years. Annual review of the strategy recommendations will be necessary as various projects or tasks are accomplished and areas atrisk decline in hazard rating. Annual review will also be needed as County infrastructure needs change or aremet and should include representation of stakeholders who participated in the development of the plan being reviewed.

A total revision of the plan every five years is recommended in accordance with revision of the County's Natural Hazard Mitigation Plan. Also, needs of the county change; specifically, population increases, fuels reduction projects are completed, emergency services are provided in outlying areas, and computer support needs are met or increased and areas of extreme wildfire hazard decline or increase.

Continued Public Involvement

The continued involvement by the public for theWest Umatilla County Wildfire Protection Plan is needed to accomplish many of the recommendations. Copies of the plan will be available at the Umatilla County Planning Department office, Oregon Department of Forestry in Pendleton, and on the web at http://www.co.umatilla.or.us/.

Continued dialogue about the mission set forth in this plan with the public is always appreciated. The website provides an opportunity to send comments and/or questions to the Plan contact at any time.

Signature Page

The contents of this plan have been agreed upon by the Umatilla Board of Commissioners, Oregon Department of Forestry and the structural fire community of Umatilla County as noted by the signatures below. This plan is a working document that will be revised and updated periodically by the originators of the plan. The contents, mission, goals, and objectives of this plan will become a part of any operation plan of the agencies represented below:

ABSENT

Commissioner Bill Hansell, Umatilla County — Date

Commissioner Larry Givens, Umatilla County — 7-22-09 — Date

BOARD OF COMMISSIONERS UMATILLA COUNTY STATE OF OREGON

Commissioner Dennis Doherty, Umatilla County — 7-22-09 — Date

Jim Whelan, Umatilla County Fire Defense Board Chief — 7/22/09 — Date

John Buckman, Oregon Department of Forestry — 7/22/09 — Date
Northeast Oregon District Forester

VIII. Appendices

Appendix A – Glossary and Acronym List

Glossary

At-Risk Community: a group of homes or other improvements (such as utilities or transportation routes) within or adjacent to federal land in which conditions are conducive to a large-scale wildland fire and pose a significant threat to human life or property.

Community Wildfire Protection Plan: a plan for at-risk communities identifying and prioritizing areas for hazardous fuels treatments, and recommending methods of treatment.

Conflagration: a raging, destructive fire. Often used to describe a fire burning under extreme fire weather. The term is also used when a wildland fire burns into a wildland-urban interface, destroying many structures.

Crown Fire: a fire tha advances from treetop to treetop or shrubs independent of a surface fire.

Defensible Space: an area, typically a width of 30 feet or more, between an improved property and a potential wildfire where the combustibles have been removed or modified.

Escape Route: route away from dangerous areas on a fire and should be pre-planned.

Evacuation: the temporary movement of people and their possessions from locations threatened by wildfire.

Extreme Fire Behavior: a level of fire behavior characteristics that ordinarily precludes methods of direct control. One or more of the following is usually involved: high rates of speed, prolific crowning and/or spotting, presence of fire whirls, a strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environments and behave erratically, sometimes dangerously.

Fire Behavior: the manner in which a fire reacts to the influences of fuel, weather and topography.

Fire Front: that part of the fire within which continuous flaming combustionis taking place. Unless otherwise specified it is assumed to be the leading edge of the fire perimeter.

Hazard: a fuel complex defined by volume, type condition, arrangement and location (topography) that determine the ease of ignition and resistance to control. Hazards may also include the built environment such as constructed improvements, access to those improvements, and water availability.

Fire Prevention: activities, including education, engineering, enforcement and administration that are directed at reducing the number of wildfires, the costs of suppression and fire-caused damage to resources and property.

Fire Protection: the actions taken to limit the adverse environmental, social, political and economical effects of fire.

Fire Regime: periodicity and pattern of naturally occurring fires in a particular area or vegetative type, described in terms of frequency, biological severity and area extent.

Fire Storm: violent convection caused by a large continuous area of intense fire. Often characterized by destructively violent surface indrafts, near and beyond the perimeter, and sometimes by tornado-like whirls.

Fire Weather: weather conditions that influence fire starts, fire behavior or fire suppression.

Firebrand: any source of heat, natural or human made, capable of igniting wildland fuels. Flaming or glowing fuel particles that can be carried naturally by wind, convection currents, or by gravity into unburned fuels. Examples include leaves, pine cones, glowing charcoal and sparks.

Fuel Condition: relative flammability of fuel as determined by fuel type and environmental conditions.

Fuel Loading: the volume of fuel in a given area generally expressed in tons per acre.

Fuel Modification: any manipulation or removal of fuels to reduce the likelihood of ignition or the resistance to fire control.

Fuels: all combustible material within the wildland-urban interface, including vegetation and structures.

Fuel Break: an area, strategically located for fighting anticipated fires, where the native vegetation has been permanently modified or replaced so that fires burning into it can be more easily controlled. Fuel breaks divide fire-prone areas into smaller areas for easier fire control and to provide access for fire fighting.

Greenbelt: a fuel break designated for use other than fire protection.

Ground Fuels: all combustible materials such as grass, duff, loose surface litter, tree or shrub roots, rotting wood, leaves, peat or sawdust that typically support combustion.

Hazardous Areas: those wildland areas where the combination of vegetation, topography, weather and the threat of fire to life and property create difficult and dangerous problems.

Hazard Reduction (see also Mitigation): any treatment of living and dead fuels that reduces the threat of ignition and spread of fire.

Ignition Probability: chance that a firebrand will cause an ignition when it lands on receptive fuels.

Initial Attack: the actions taken by the first resources to arrive at a wildfire to protect lives and property, and preventfurther extension of the fire.

Ladder Fuels: fuels that provide vertical continuity allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease.

Mitigation: action that alleviates the severity of a fire hazard or risk

Overstory: that portion of the trees in a forest that forms the upper or uppermost layer.

Preparedness: 1) Condition or degree of being ready to cope with a potential fire situation. 2) Mental readiness to recognize changes in fire danger and act promptly when action is appropriate.

Prescribed Burning: controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions, which allows the fire to be confined to a predetermined area, and toproduce the fire behavior and fire characteristics required to attain planned fire treatment and resource management objectives.

Risk: the chance of a fire starting from any cause.

Structural Fire Agency: a firefighting organization, usually at the locallevel, trained and equipped to fight structure fires. Local structural fire agencies may also be trained and equipped to combat wildland fires.

Suppression: the most aggressive fire protection strategy, it leads to the total extinguishment of a fire.

Surface Fuel: fuels lying on or near the surface of the ground, consisting of leaf and needle litter, dead branch material, downed logs, bark, tree cones, and low stature living plants.

Survivable Space: the characteristics of a home, its materials and design, in concert with the flammable materials in a home's immediate surroundings that result in high ignition resistance from flames and firebrands (burning embers). Survivable space characteristics relate to the ignitability of a home without necessarily including the higher thermal vulnerability of firefighters.

Tree Crown: the primary and secondary branches growing out from the main stem, together with twigs and foliage.

Understory: low-growing vegetation under a stand of trees. Also, that portion of trees in a forest stand below the overstory.

Wildfire: an unplanned and uncontrolled fir spreading through vegetative fuels, at times involving structures.

Wildfire Causes: the general causes of wildland fires are 1) natural, like lightning; 2) accidental, like debris burning; and 3) intentional, like arson.

Wildland: an area in which development is essentially non-existent, except for roads, railroads, power lines and similar transportation facilities. Structures, if any, are widely scattered.

Wildland Fire: any fire occurring on the wildlands, regardless of ignition source, damages or benefits.

Wildland Fire Agency: a firefighting organization, usually at the state or federal level, trained and equipped to fight wildland fires. Typically, wildland fire agencies are not trained and equipped to combat structure fires.

Wildland-Urban Interface: an area within or adjacent to an at-risk community where wildland fuels intermix with combustible homes and structures. Wildland-Urban Interface areas in Umatilla County are identified in the Umatilla County Community Wildfire Protection Plan – Blue Mountains/Foothills Region and West Umatilla County.

Acronym List

BIA – Bureau of Indian Affairs

BLM – Bureau of Land Management

CAR – Community at Risk

CSEPP – Chemical Stockpile Emergency Preparedness Program

CTUIR – Confederated Tribes of the Umatilla Indian Reservation

EOC – Emergency Operations Center

EOP – Emergency Operations Plan

FEMA – Federal Emergency Management Agency

HFRA – Healthy Forests Restoration Act

NFP – National Fire Plan

NRCS – Natural Resource Conservation Service

ODF – Oregon Department of Forestry

ODOT – Oregon Department of Transportation

OEM – Oregon Emergency Management

OSFM – Oregon State Fire Marshall

OSP – Oregon State Police

PLS – Public Land Survey

RFPA – Rangeland Fire Protection Association

RFPD – Rural Fire Protection District

UCES – Umatilla County Emergency Services

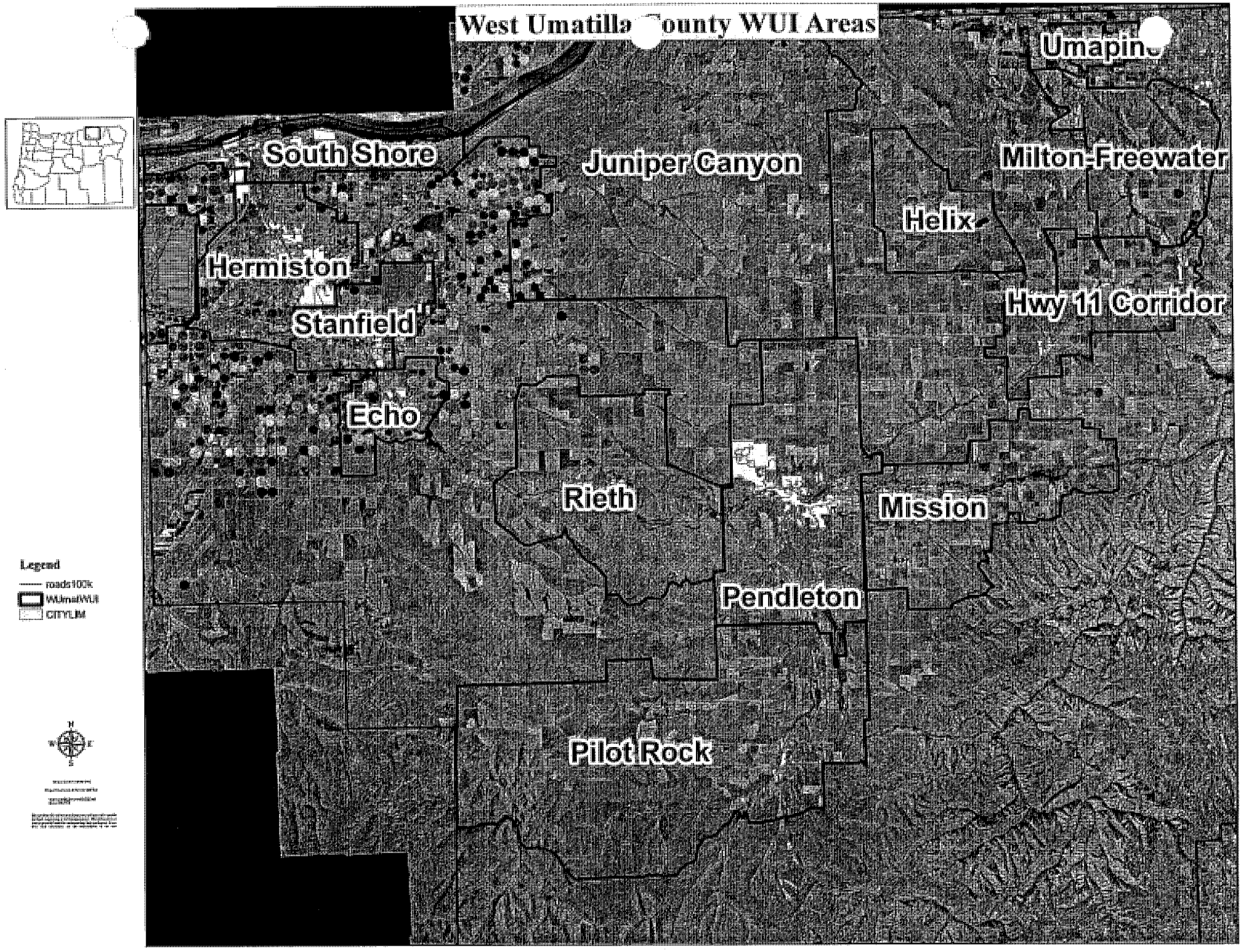
USFS – United States Forest Service

USFWS – United States Fish & Wildlife Service

WUI – Wildland-Urban Interface

Appendix B – Maps

Maps follow this page.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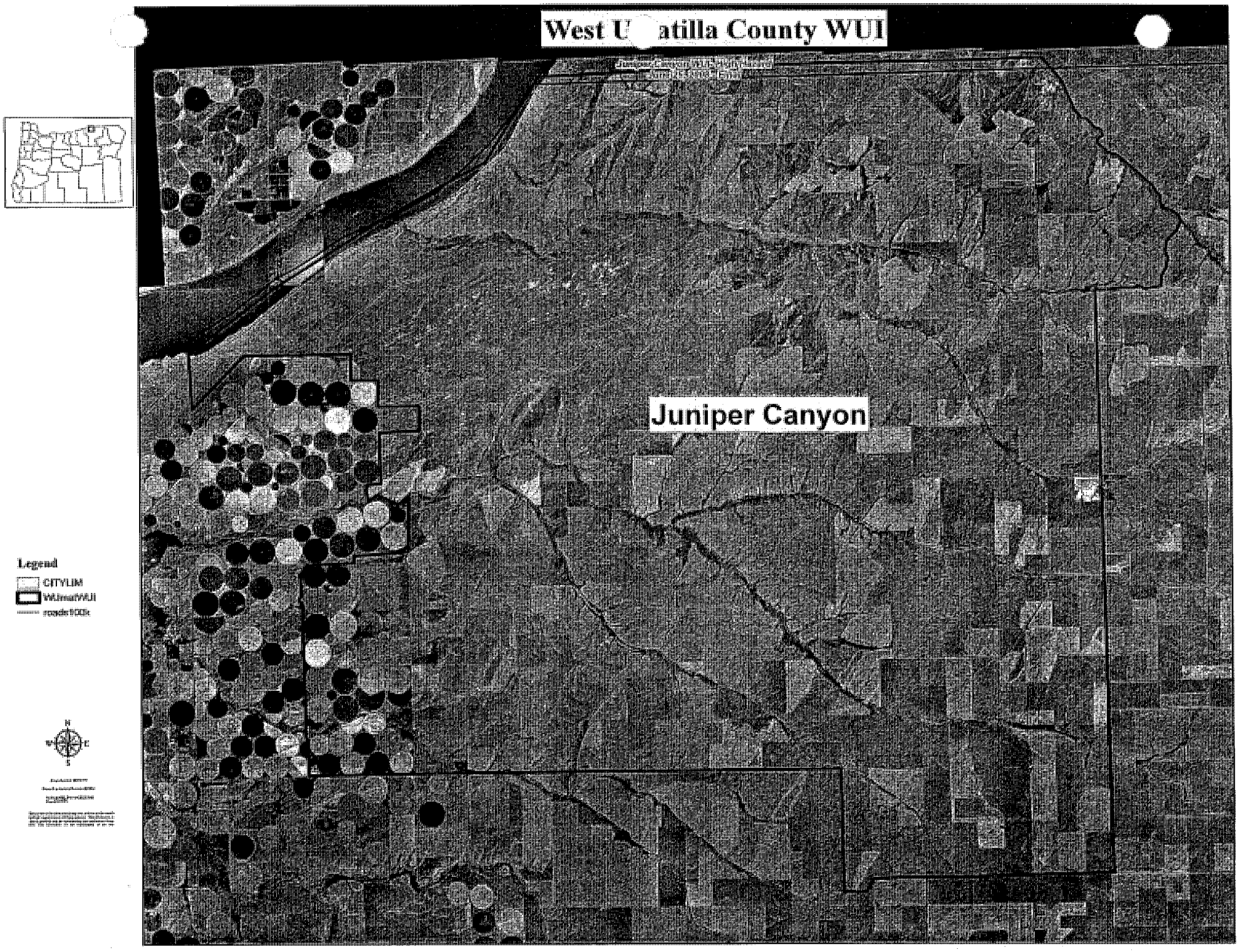
South Shore
Juniper Canyon
Milton-Freewater
Helix
Hermiston
Hwy 11 Corridor
Stanfield
Echo
Rieth
Mission
Pendleton
Pilot Rock
Legend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Juniper Canyon
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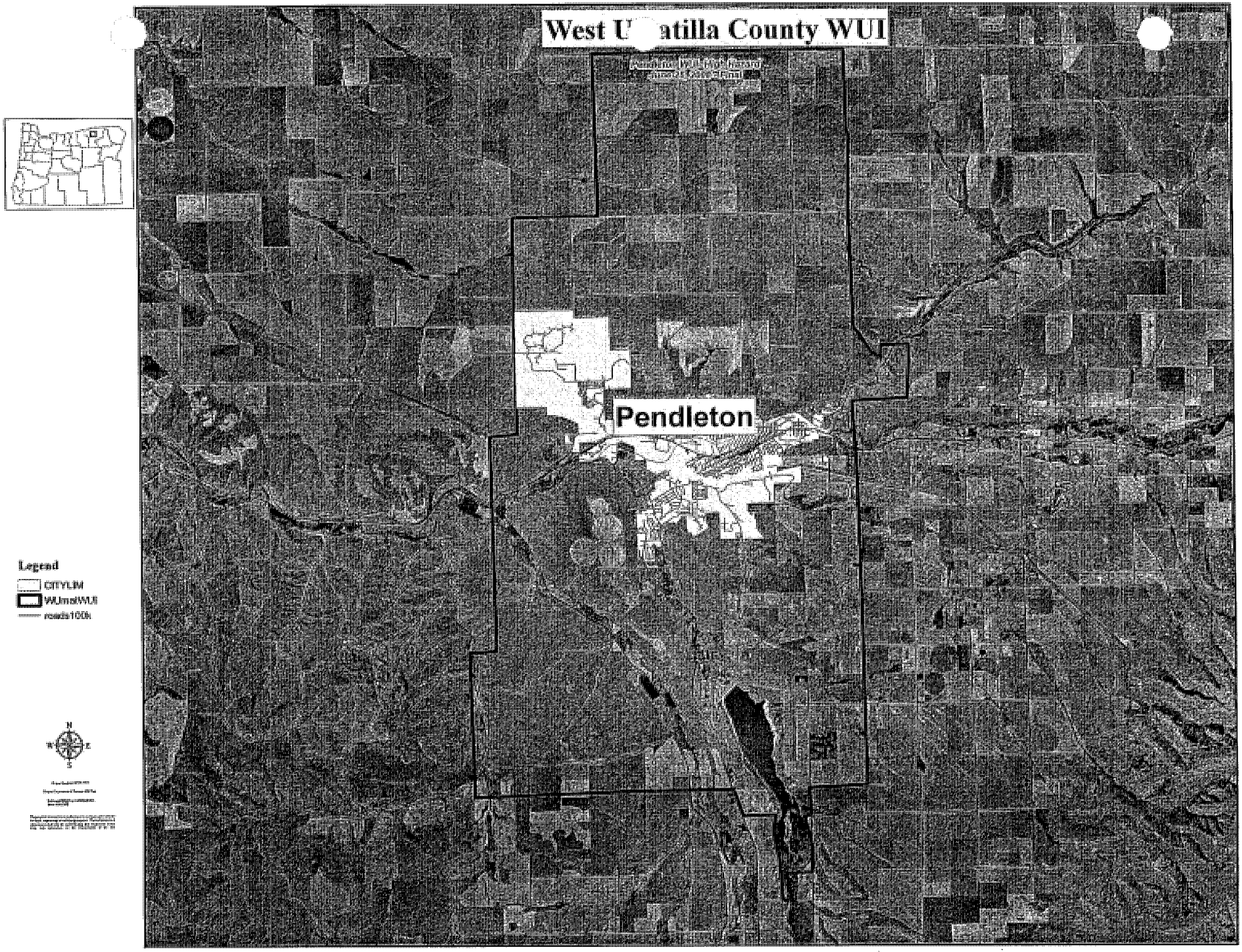
CITYLIM
WUI
roads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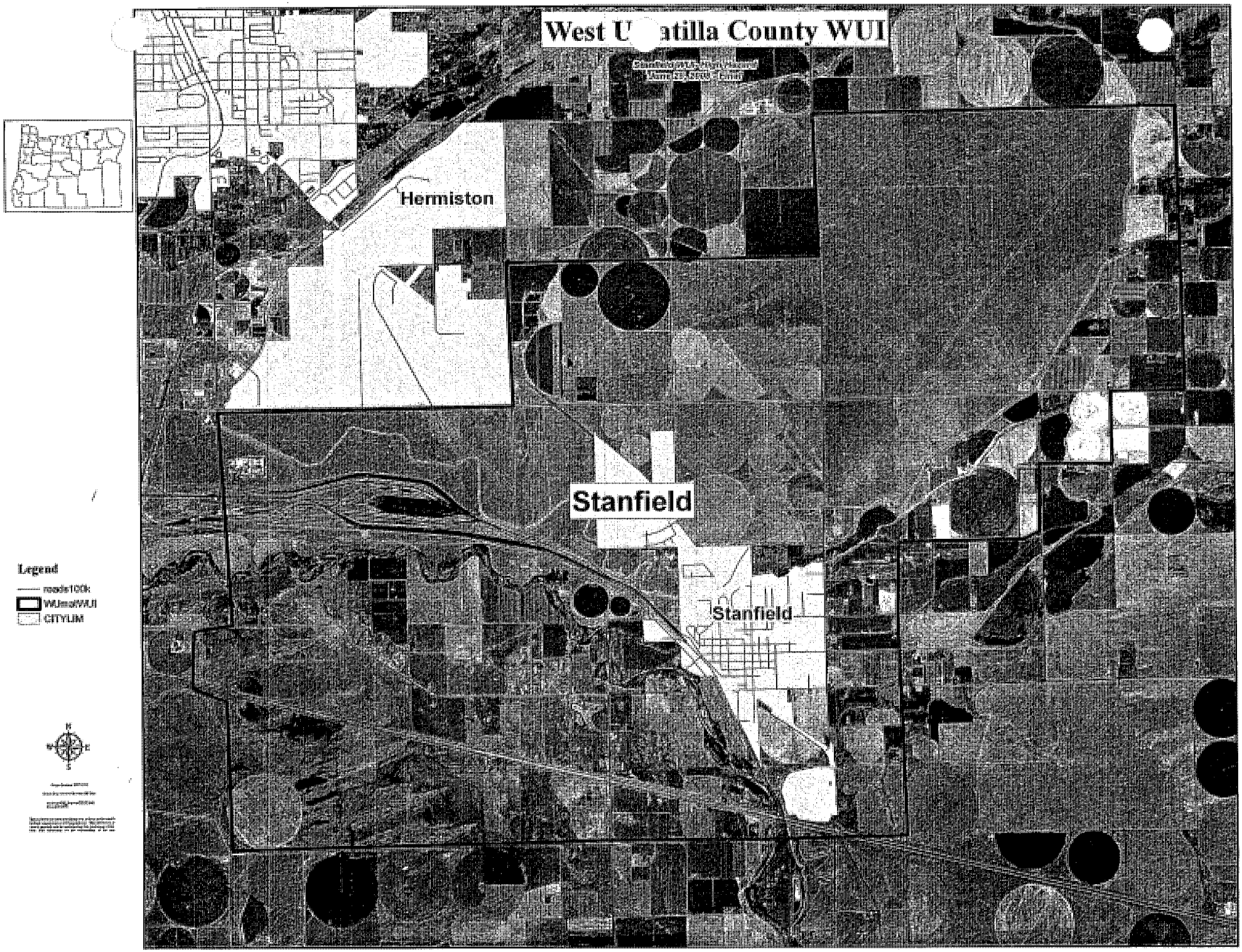
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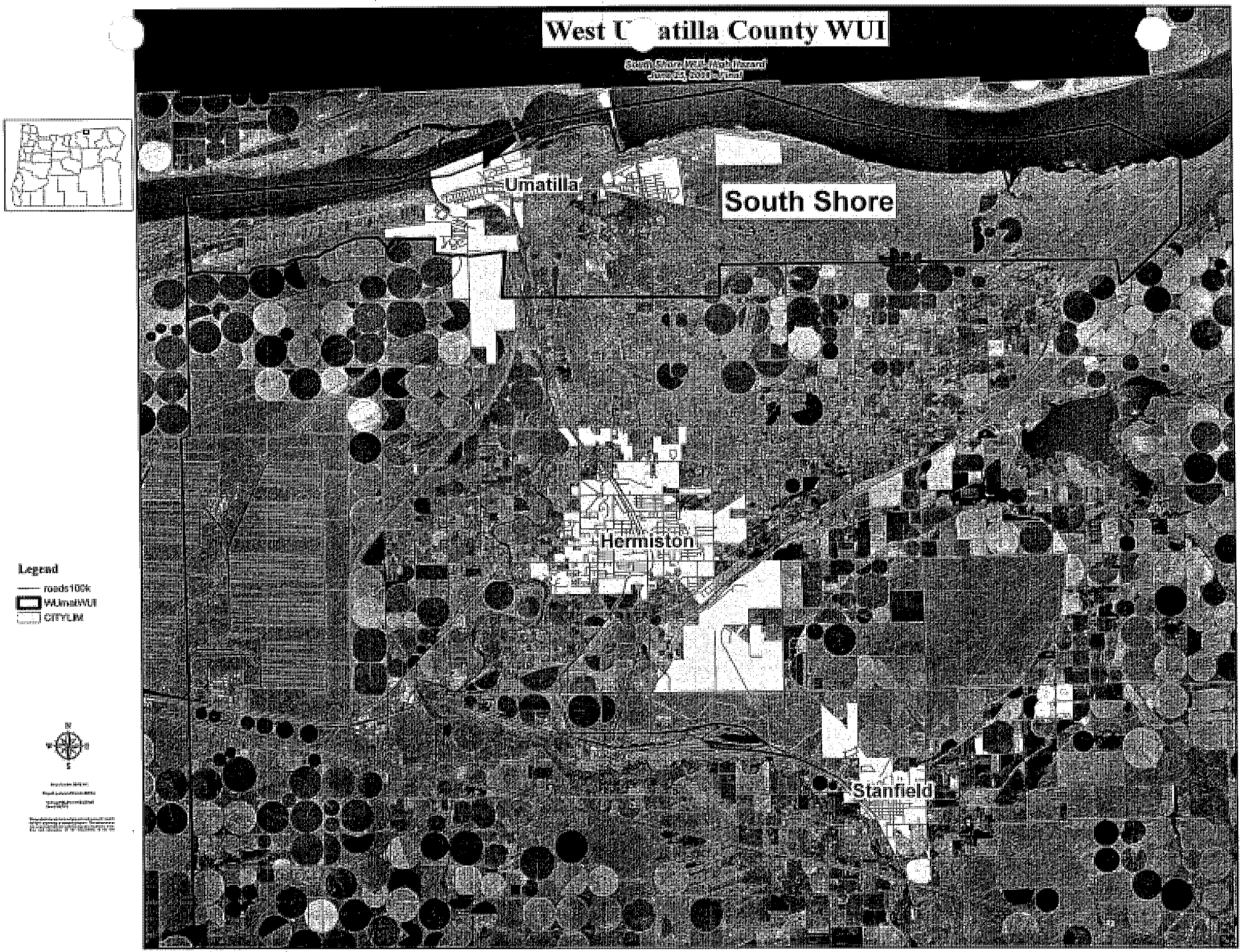
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South Shore
Hermiston
Stanfield
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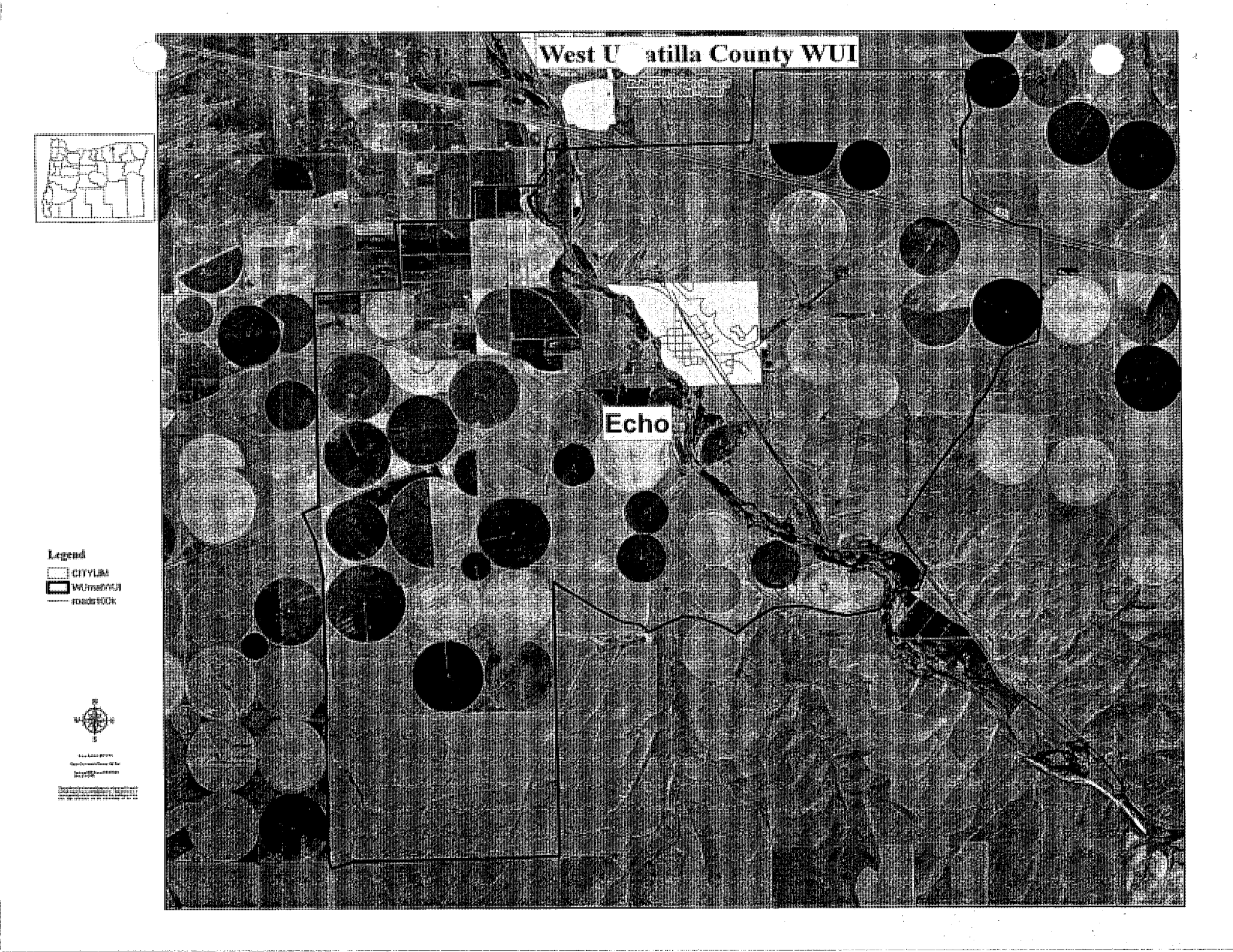
CITYLIM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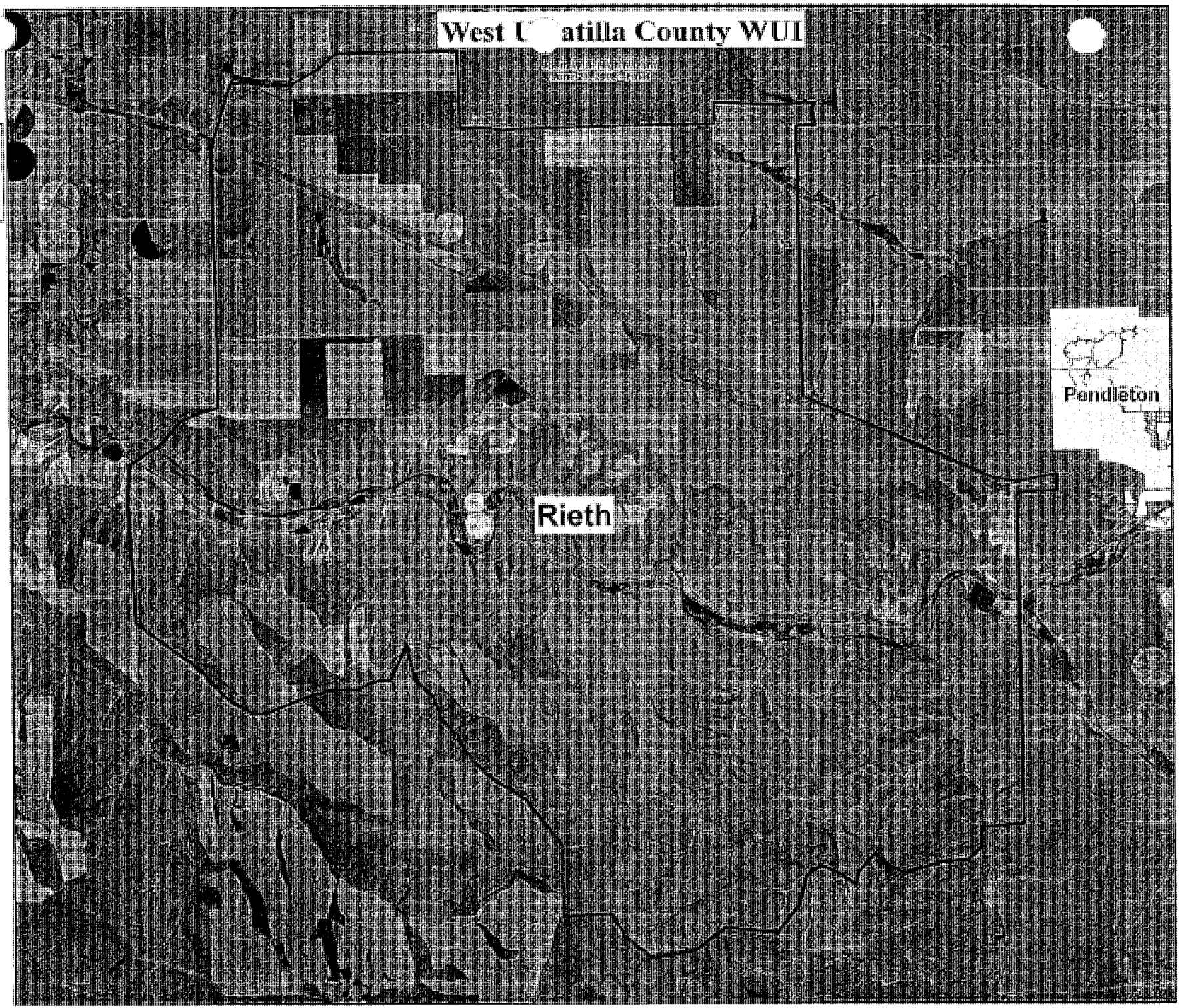
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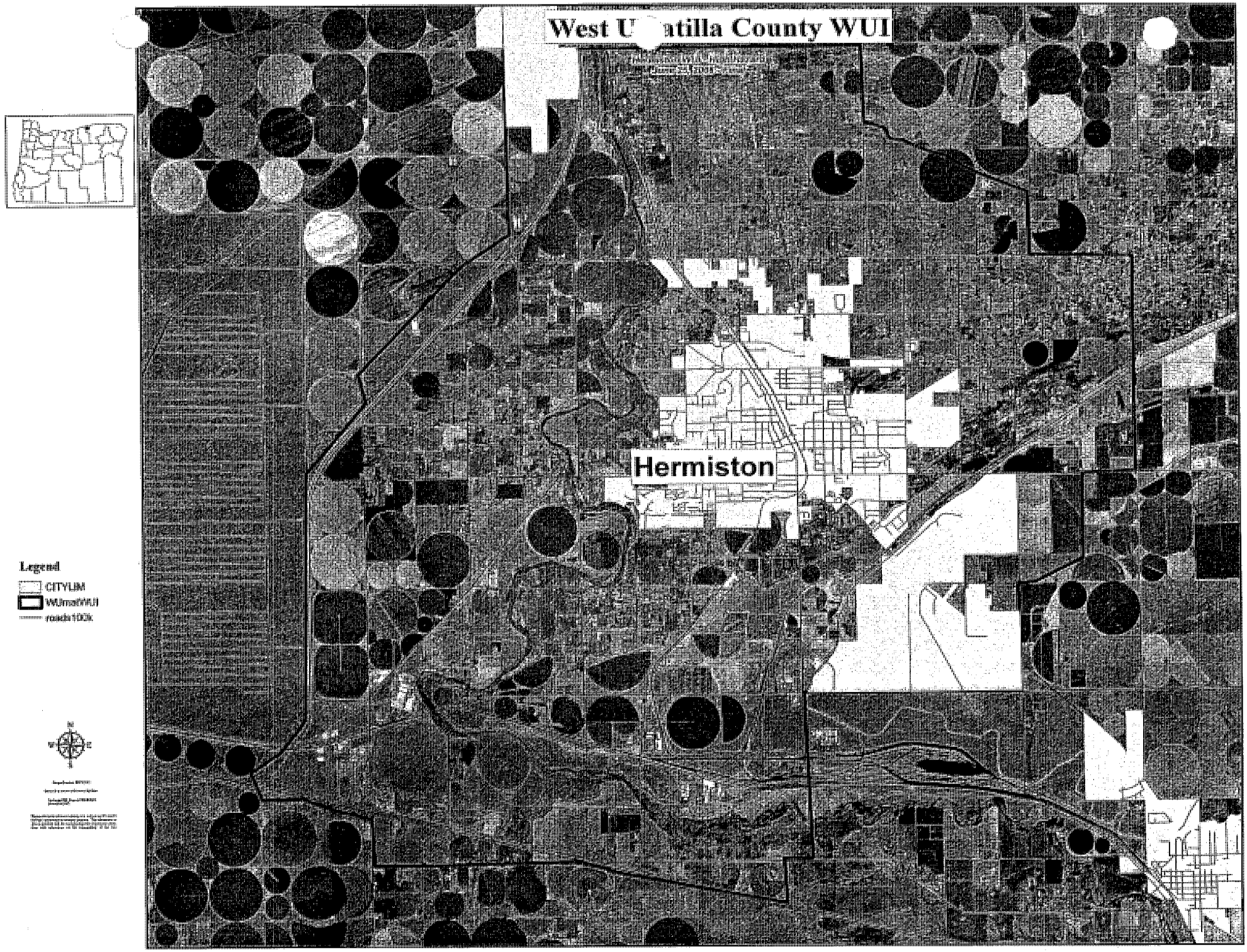
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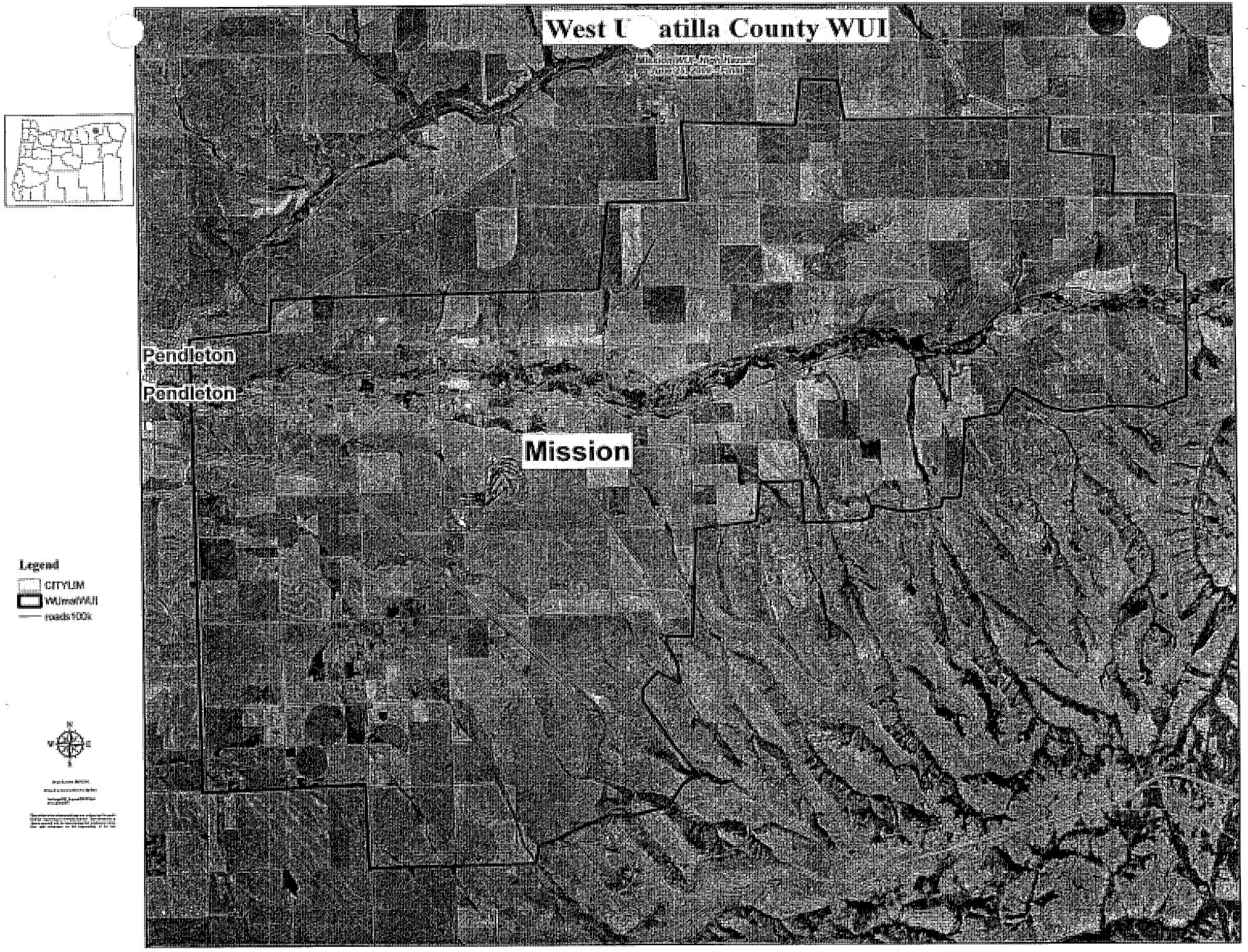
Hermiston
Legend
CITYLIM
WUImod/WUI


West U atilla County WUI
Pendleton
Pendleton
Mission
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West U atilla County WUI
Helix
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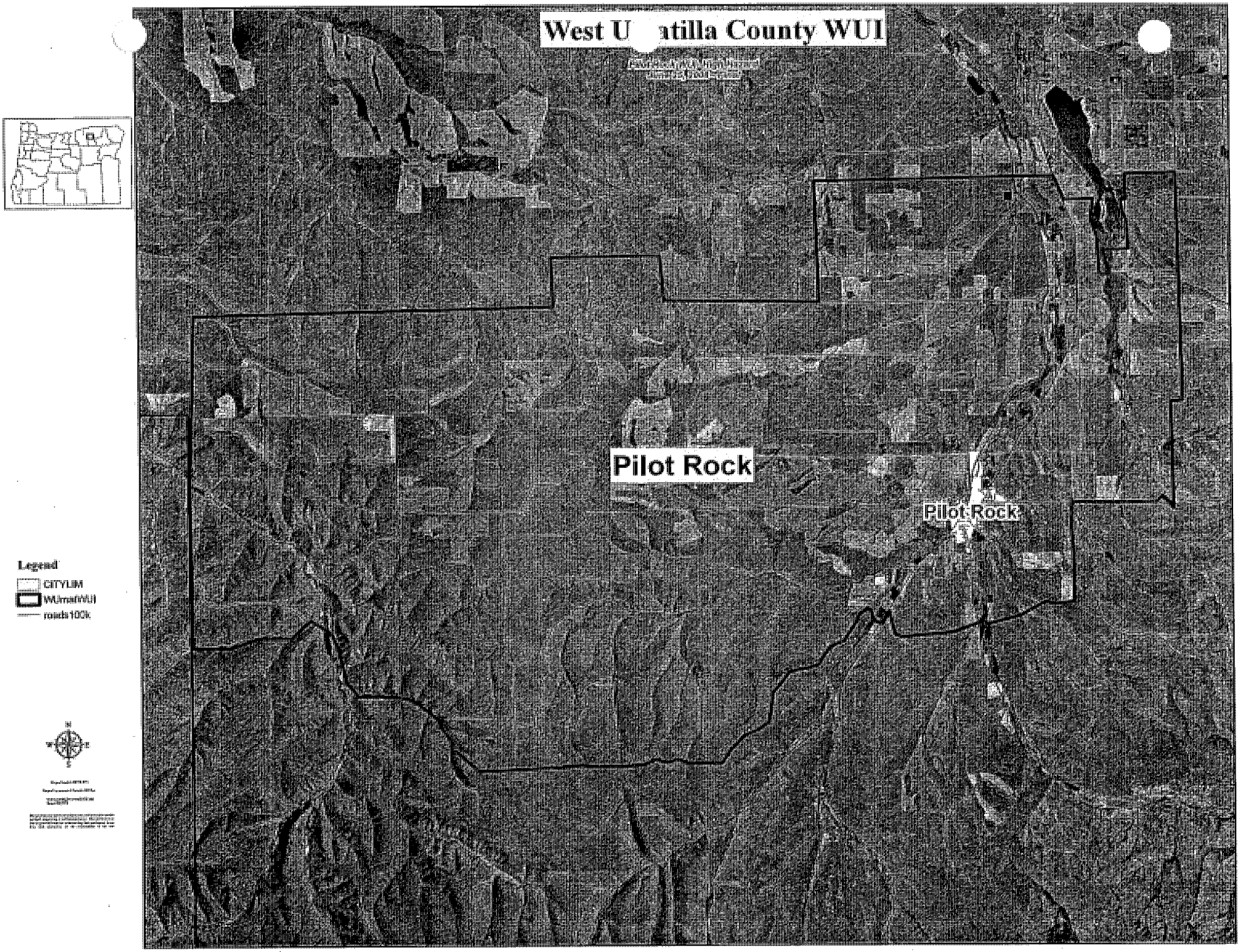
WUInterfWUI
roads100k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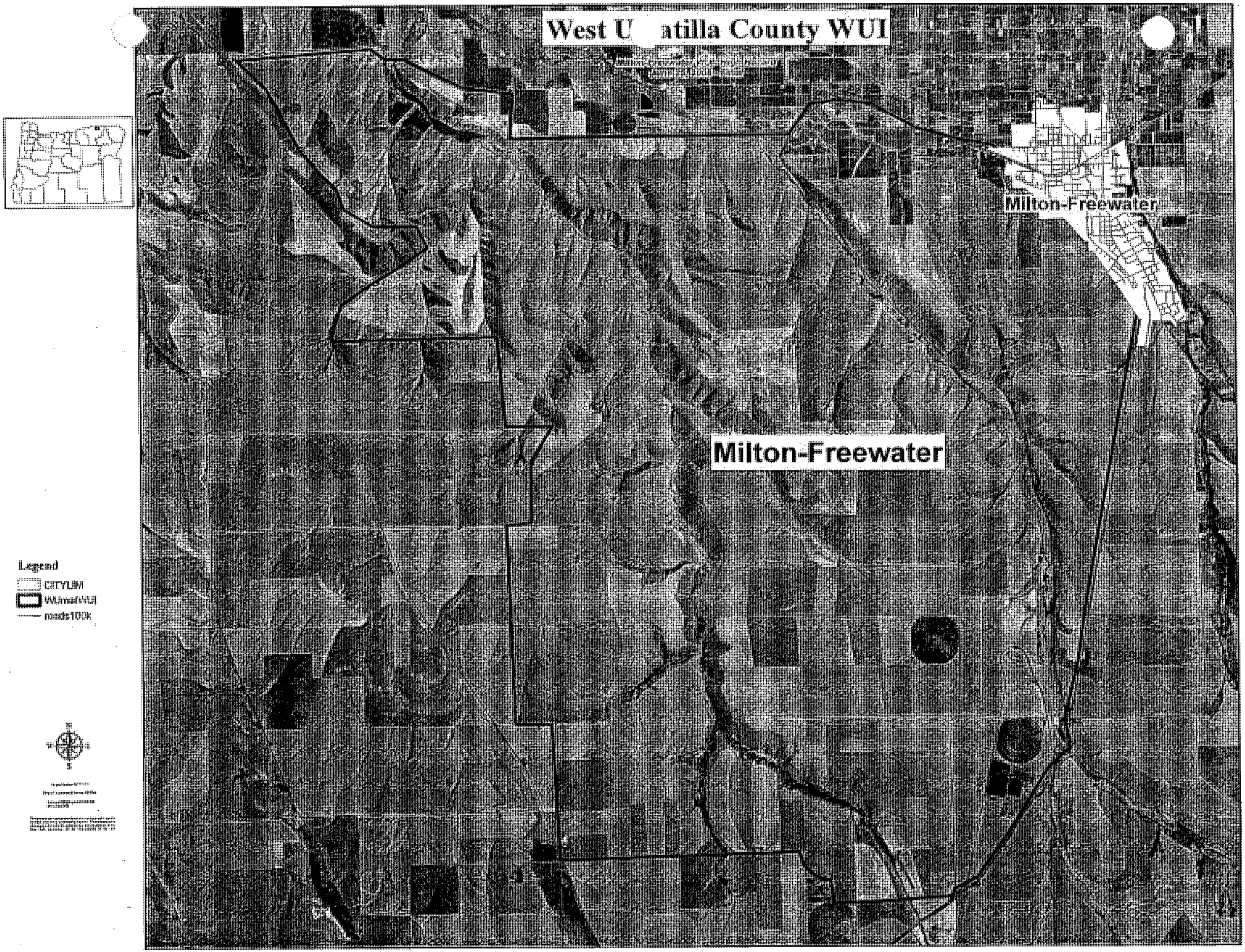
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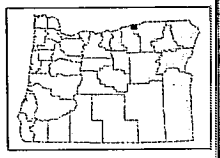

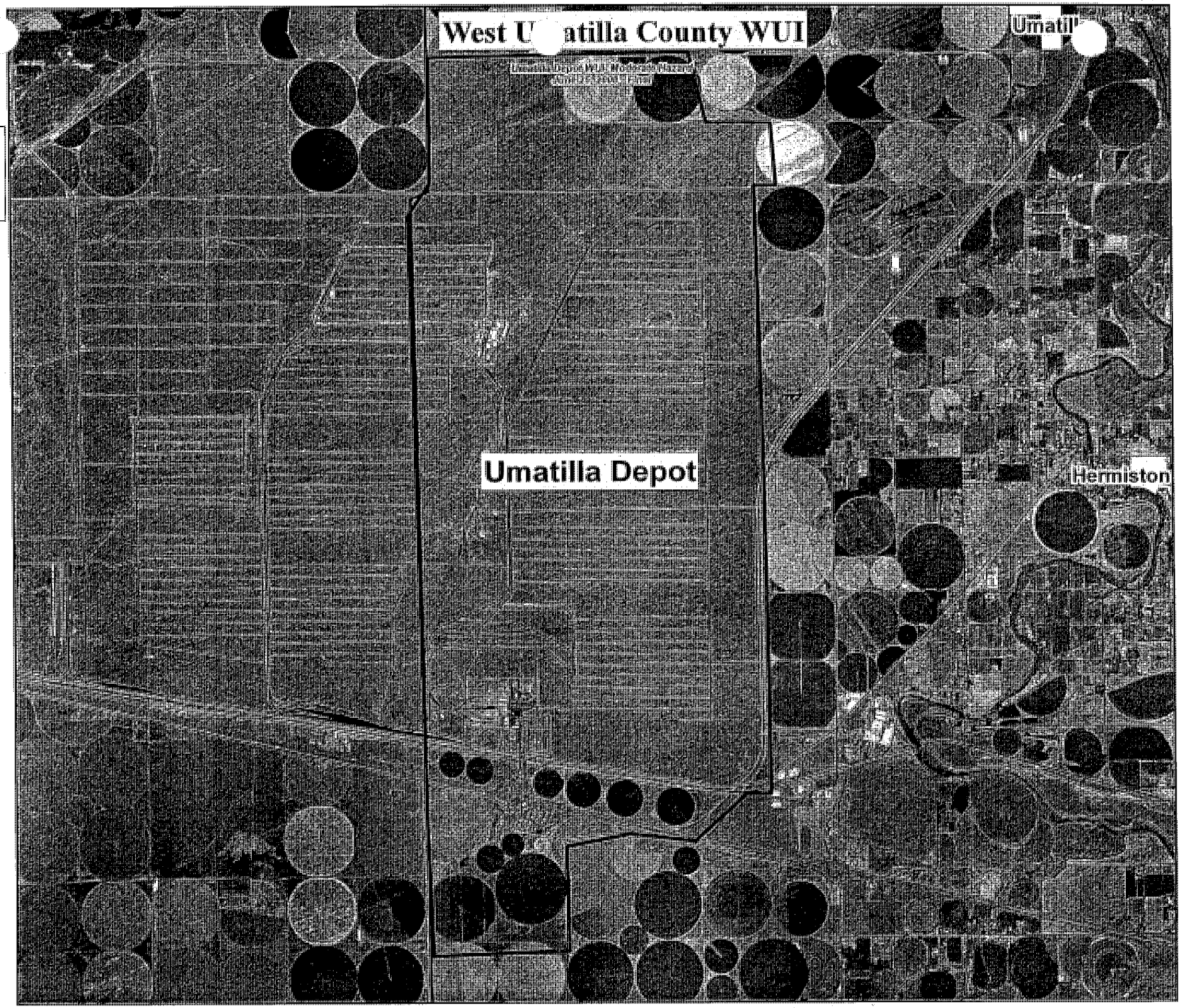

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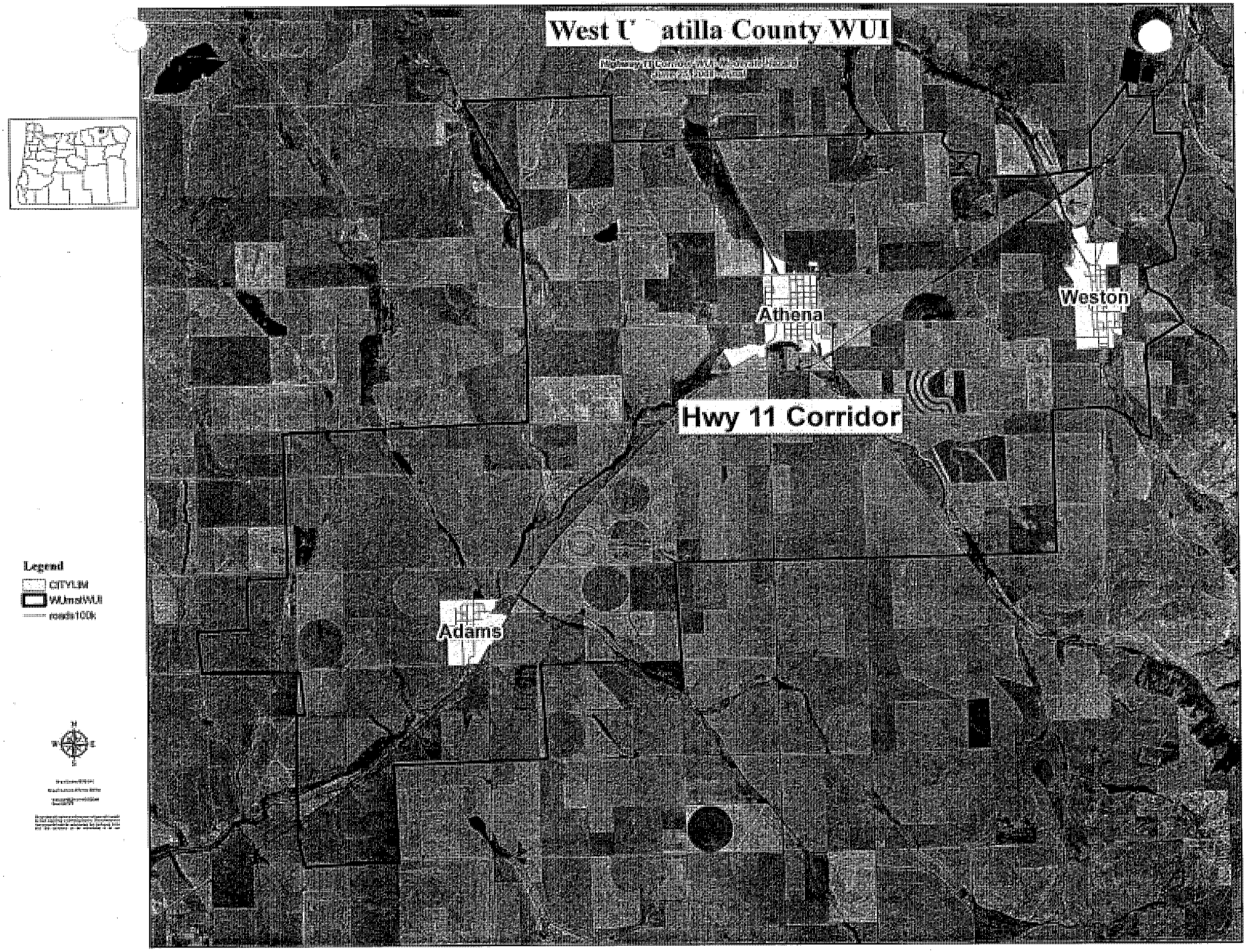
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Athena
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Hwy 11 Corridor
Adams
Legend
CITYLIM
WUIMaskWUI
roads100k

Appendix C – Mitigation Action Sheets

Juniper Canyon WUI
CAR Name: Holdman

Priority Category: High

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
3 (H)	5 (H)	3 (M)	5 (H)	3 (H)	2 (H)	21 (H)

Education Projects

- Distribute Farm and Ranch Fire Safety Brochureto individual landowners.
- Utilize fire prevention measures during traditional fire season months, like having tools and water available while mowing or welding.
- Encourage recycling of flammable materials and chemicals.

Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields and along roads.
- Coordinate with NRCS to determine best times to mow or burn CRP when creating fire-adaptive landscapes.
- Coordinate with Lewis & Clark College to develop a plan for building in a fire break around homes proposed in subdivision proposed along river.

Emergency Response Projects

- County to determine how homes proposed along river (Lewis & Clark College land development) will receive structural fire protection.
- Encourage and support development of a RFPA (possibly room for two).
- Improve coordination and communication for response to BLM parcels within WUI.

Pendleton WUI
CAR Name: Pendleton, Riverside, McKay **Priority Category:** High

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
3 (H)	3 (M)	3 (M)	5 (H)	3 (H)	2 (H)	19 (H)

Education Projects

- Explore creating Firewise communities in the area.
- Participate in community events, distributing fire prevention materials.
- Distribute information related to ordinances already in place; determine how those ordinances can be enforced or enhanced.

Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields, along roads and directly behind subdivisions.
- Coordinate with NRCS to determine best times to mow or burn CRP when creating fire-adaptive landscapes.

Emergency Response Projects

- Use radio media for communicating emergencies.
- Determine practicality for using Reverse 9-1-1 in emergency situations.
- Resolve communication issues – frequency problems and confusion when/where to deal with different dispatch centers (Umatilla County vs. PICC).
- Determine how best to provide Logistics to fully support large incidents.
- Develop process for identification, use, and training in handling air resources.

Stanfield WUI
CAR Name: Stanfield, Hazel Lane, Ash Road **Priority Category**: High

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
3 (H)	5 (H)	3 (M)	3 (M)	3 (H)	2 (H)	19 (H)

Education Projects

- Distribute Farm and Ranch Fire Safety Brochure at community events
- Create bilingual version of "Surviving Wildfire" Program.
- Utilize fire prevention measures during traditional fire season months, like having tools and water available while mowing or welding.
- Encourage recycling of flammable materials and chemicals.

Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields and along roads.
- City to work with farmers to create fire breaks adjacent to buildings in town.
- Railroad to create fire breaks on property to eliminate fire spread to WUI.
- Specific treatment areas to consider would be the open space that abuts Vantage Addition, wetland area near Orchard Park, and CRP adjacent to Hazel Lane.

Emergency Response Projects

- Work with Railroad to implement emergency response procedure.
- Improve communications with USF&W. Frequency issues arise when Stanfield Fire responds to Cold Springs to assist USF&W.

Southshore WUI
CAR Name: Umatilla, Hat Rock, Southshore **Priority Category**: High

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
2 (M)	3 (M)	3 (M)	5 (H)	3 (H)	2 (H)	18 (H)

Education Projects

- Distribute Farm and Ranch Fire Safety Brochure at community events
- Utilize fire prevention measures during traditional fire season months, like having tools and water available while mowing or welding.
- Encourage recycling of flammable materials and chemicals.
- Post prevention signs in susceptible areas along river– those areas you know population recreates.

Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields and along roads.
- Coordinate with NRCS to determine best times to mow or burn CRP when creating fire-adaptive landscapes.
- City to work with farmers to create fire breaks adjacent to buildings in town.

Emergency Response Projects

- Use radio media for communicating emergencies.
- Determine practicality for using Reverse 9-1-1 in emergency situations.
- Determine capability of fire department to respond to a wildland fire event.

Echo WUI

CAR Name: Echo, Butter Creek, I-84 Corridor **Priority Category:** High

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
3 (H)	3 (M)	3 (M)	5 (H)	3 (H)	1 (L)	18 (H)

Education Projects

- Distribute Farm and Ranch Fire Safety Brochure at community events.
- Utilize fire prevention measures during traditional fire season months, like having tools and water available while mowing or welding.
- Encourage recycling of flammable materials and chemicals.

Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields and along roads.
- Coordinate with NRCS to determine best times to mow or burn CRP when creating fire-adaptive landscapes.
- City to work with farmers to create fire breaks adjacent to buildings in town.

Emergency Response Projects

- Use radio media for communicating emergencies.
- Work with Railroad to implement emergency response procedure.
- Determine practicality for using Reverse 9-1-1 in emergency situations.

Rieth WUI
CAR Name: Rieth

Priority Category: High

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
3 (H)	3 (M)	3 (M)	5 (H)	3 (H)	1 (L)	18 (H)

Education Projects

- Distribute Farm and Ranch Fire Safety Brochure at community events.
- Utilize fire prevention measures during traditional fire season months, like having tools and water available while mowing or welding.
- Encourage recycling of flammable materials and chemicals.

Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields and along roads.
- Coordinate with NRCS to determine best times to mow or burn CRP when creating fire-adaptive landscapes.
- City to work with farmers to create fire breaks adjacent to buildings in town.

Emergency Response Projects

- Use radio for communicating emergencies.
- Determine practicality for using Reverse 9-1-1 in emergency situations.

Hermiston WUI
CAR Name: Hermiston **Priority Category**: High

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
3 (H)	3 (M)	3 (M)	3 (M)	3 (H)	2 (H)	17 (H)

Education Projects

- Distribute Farm and Ranch Fire Safety Brochure at community events
- Create bilingual version of "Surviving Wildfire" Program.
- Utilize fire prevention measures during traditional fire season months, like having tools and water available while mowing or welding.
- Encourage recycling of flammable materials and chemicals.
- Work with railroad to develop a plan for prevention, like right-of-way treatment, spark arrestor clean-out, and watchman service after work is conducted on tracks.
- Develop burn management/smoke management plans.

Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields and along roads.
- Coordinate with NRCS to determine best times to mow or burn CRP when creating fire-adaptive landscapes.
- City to work with farmers to create fire breaks adjacent to buildings in town.
- Specific treatment opportunities to consider are the Irrigation District property, maintenance of ODOT projects, and the railroad right-of-way.

Emergency Response Projects

- Use radio media for communicating emergencies.
- Determine practicality for using Reverse 9-1-1 in emergency situations.
- Improve radio communication interoperability.

Mission WUI
CAR Name: Mission, Wildhorse **Priority Category:** High

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
3 (H)	3 (M)	3 (M)	3 (M)	3 (H)	2 (H)	17 (H)

Education Projects

- Distribute Farm and Ranch Fire Safety Brochure at community events like Health & Safety Fair and Salmon Walk
- Encourage Firewise Communities practices around homesites.
- Promote spring clean-up day.
- Conduct fire prevention program in the school– both elementary and high school.
- Utilize fire prevention measures during traditional fire season months, like having tools and water available while mowing or welding.
- Encourage recycling of flammable materials and chemicals.
- Continue to implement burn permit/smoke management program. Improve communication about the program with the community.
- Adopt Umatilla County CWPP into planning; continue to implement strategies in CWPP.

Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields and along roads.
- Coordinate with NRCS to determine best times to mow or burn CRP when creating fire-adaptive landscapes.
- Continue implementation of BIA fuels treatment projects; maintain completed projects.
- CTUIR to work with farmers to create fire breaks adjacent to buildings in community.
- Work with railroad to create a fuels treatment project along rail line in WUI.

Emergency Response Projects

- Seek alternative funding source for radio frequency maintenance and equipment (once CSEPP funding
- CTUIR Fire needs to purchase tender.
- Improve volunteer recruitment practices.
- Continue to provide annual refreshers to firefighters.

Helix WUI
CAR Name: Helix

Priority Category: High

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
2 (M)	5 (H)	1 (L)	5 (H)	3 (H)	1 (L)	17 (H)

Education Projects

- Distribute Farm and Ranch Fire Safety Brochure at community events
- Utilize fire prevention measures during traditional fire season months, like having tools and water available while mowing or welding.
- Encourage recycling of flammable materials and chemicals.

Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields and along roads.
- Coordinate with NRCS to determine best times to mow or burn CRP when creating fire-adaptive landscapes.
- City to work with farmers to create fire breaks adjacent to buildings in town.

Emergency Response Projects

- Use radio media for communicating emergencies.
- Determine practicality for using Reverse 9-1-1 in emergency situations.

Pilot Rock WUI

CAR Name: Pilot Rock, West Hills, Butter Creek **Priority Category:** High

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
2 (M)	5 (H)	3 (M)	3 (M)	3 (H)	1 (L)	17 (H)

Education Projects

- Distribute Farm and Ranch Fire Safety Brochure at community events
- Utilize fire prevention measures during traditional fire season months, like having tools and water available while mowing or welding.
- Encourage recycling of flammable materials and chemicals.

Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields and along roads.
- Coordinate with NRCS to determine best times to mow or burn CRP when creating fire-adaptive landscapes.
- City to work with farmers to create fire breaks adjacent to buildings in town.

Emergency Response Projects

- Use radio media for communicating emergencies.
- Determine practicality for using Reverse 9-1-1 in emergency situations.
- Utilize neighborhood watch program to notify residents in case of emergency.

Milton-Freewater WUI
CAR Name: Milton-Freewater, Umapine **Priority Category:** High

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
2 (M)	3 (M)	3 (M)	5 (H)	3 (H)	1 (L)	17 (H)

Education Projects

- Distribute Farm and Ranch Fire Safety Brochure at community events
- Utilize fire prevention measures during traditional fire season months, like having tools and water available while mowing or welding.
- Encourage recycling of flammable materials and chemicals.

Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields and along roads.
- Coordinate with NRCS to determine best times to mow or burn CRP when creating fire-adaptive landscapes.
- City to work with farmers to create fire breaks adjacent to buildings in town.

Emergency Response Projects

- Use radio for communicating emergencies.
- Determine practicality for using Reverse 9-1-1 in emergency situations.
- Explore practicality of wildland training for City of Milton-Freewater Fire Department, including funding.

Umatilla Depot WUI
CAR Name: Umatilla Depot **Priority Category**: Moderate

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
1 (L)	3 (M)	3 (M)	3 (M)	3 (H)	2 (H)	15 (M)

Education Projects

- Utilize fire prevention measures during traditbnal fire season months, like having tools and water available while mowing or welding.
- Develop fire prevention plan and share with the County.

Treatment Projects

- Conduct fuels treatment on Depot property, utilizing tilling, discing, and reseeding to fire-resistant natural vegetation.
- Develop maintenance plan for fuels treatment.

Emergency Response Projects

- Improve response on Depot.
- Develop contingency plan for fire escape off of Depot.

Umapine WUI
CAR Name: Umapine

Priority Category: Moderate

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
1 (L)	3 (M)	3 (M)	3 (M)	3 (H)	1 (L)	14 (M)

Education Projects

- Distribute Farm and Ranch Fire Safety Brochure at community events
- Utilize fire prevention measures during traditional fire season months, like having tools and water available while mowing or welding.
- Encourage recycling of flammable materials and chemicals.

Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields and along roads.
- Coordinate with NRCS to determine best times to mow or burn CRP when creating fire-adaptive landscapes.
- City to work with farmers to create fire breaks adjacent to buildings in town, like the school.

Emergency Response Projects

- Use radio for communicating emergencies.
- Determine practicality for using Reverse 9-1-1 in emergency situations.

Highway 11 Corridor WUI
CAR Name: Adams, Athena

Priority Category: Moderate

Risk Assessment Factors

Fire Occurrence	Topography	Total Fuels	Protection Capability	Weather	Values At-Risk	Aggregate Score
1 (L)	5 (H)	1 (L)	3 (M)	3 (H)	1 (L)	14 (M)

Education Projects

- Distribute Farm and Ranch Fire Safety Brochure at community events
- Utilize fire prevention measures during traditional fire season months, like having tools and water available while mowing or welding.
- Encourage recycling of flammable materials and chemicals.

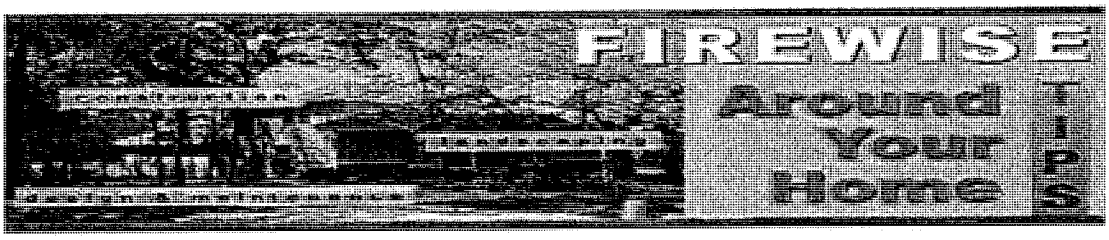
Treatment Projects

- Utilize agroforestry practices to create fire breaks between fields.
- Utilize green and brown stripping; create defensible space with tilling and discing practices between fields and along roads.
- Coordinate with NRCS to determine best times to mow or burn CRP when creating fire-adaptive landscapes.
- City to work with farmers to create fire breaks adjacent to buildings in town, like the school.

Emergency Response Projects

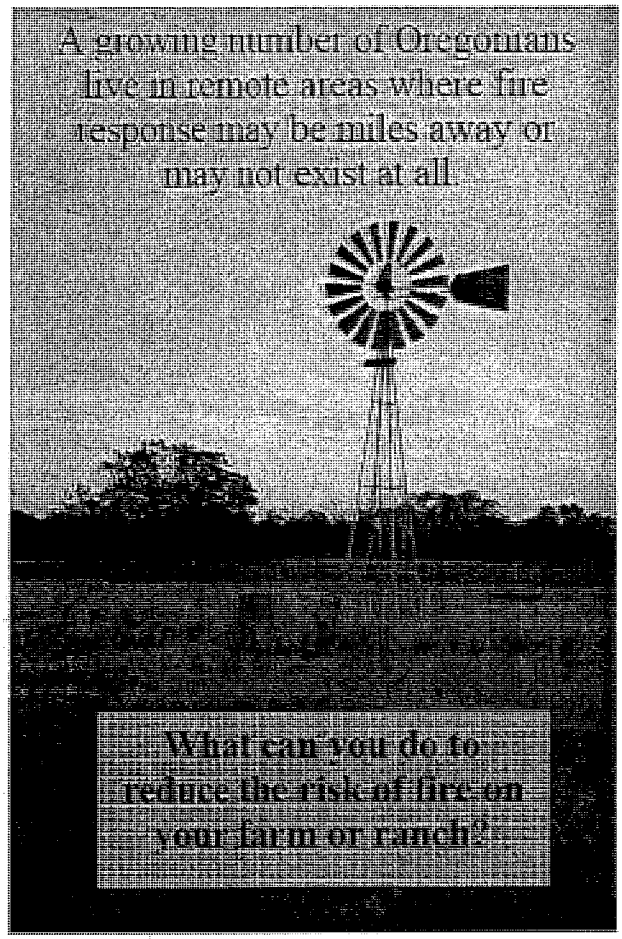
- Use radio for communicating emergencies.
- Determine practicality for using Reverse 9-1-1 in emergency situations.

Appendix D – Firewise Checklist



- ✓ Keep a clearing of at least 30 feet around your house for fire fighting equipment.
- ✓ Space the trees you plant carefully.
- ✓ Remove **ladder fuels**. They link the grasses and brush with the tree tops.
- ✓ Create a **fuel break** - driveways, gravel walkways, or lawns.
- ✓ Maintain your irrigation system regularly.
- ✓ Prune limbs so the lowest is between 6' - 10' from the ground.
- ✓ Remove leaf litter from your roof and yard.
- ✓ Mow regularly.
- ✓ Remove dead or overhanging branches.
- ✓ Store firewood away from your house.
- ✓ Refuel garden equipment carefully and maintain regularly.
- ✓ If you smoke, use your ashtray.
- ✓ Store and use flammable liquids properly.
- ✓ Dispose of cuttings and debris promptly, according to local regulations.
- ✓ Observe local regulations regarding vegetative clearances and fire safety equipment requirements.
- ✓ Check your generator and/or hose to be sure it is in good repair.
- ✓ Don't keep combustibles under decks or elevated porches.
- ✓ Make trellises of non-flammable metal.
- ✓ Have at least two ground-level doors as safety exits.
- ✓ Keep at least two means of escape (either a door/window) in each room.
- ✓ Mark your driveway and access roads clearly.
- ✓ Keep ample turnaround space near your house for fire equipment.
- ✓ Prevent sparks from entering your house by covering vents with wire mesh no larger than 1/8".
- ✓ When possible, use construction materials that are fire-resistant or non-combustible.

Appendix E – Farm and Ranch Fire Safety Checklist



Farm and ranch activities are associated with fire starts across Oregon. Take the time to check your farm or ranch for things you can do to mitigate the risk of a wildfire. It can make a difference.

Farm and Ranch Fire Safety – It's up to you!

This message from the following sponsors –

Fires associated with farm and ranch operations account for hundreds of thousands of dollars loss each year. Most large farms and ranches in eastern Oregon are in remote locations where assistance from a fire protection agency is limited (lengthy response time) or non-existent (unprotected areas).

You can....

- ✓ **Use fire-resistant building materials.** Install metal, tile or concrete roofing material when building or remodeling. Use fire-resistant siding such as brick, metal, concrete or stucco. Cover all vents with 1/8" mesh screen to block embers from entering the structure.
- ✓ **Check the survivable space around your home and outbuildings.** Clear flammable vegetation and replace with fire-resistant plants or keep dry grass mowed. Move wood piles and lumber away from structures. Store gasoline, propane, fertilizer and other flammables away from the home (preferably in a metal shed). Check the distance between buildings and hay storage – have a plan to deal with a fire in any one structure to keep it from spreading to another.
- ✓ **Check the electrical wiring.** Ensure that electrical wiring is protected from potential animal damage and that it is grounded and adequate for the load. Avoid overloading circuits. This includes irrigation pumps.
- ✓ **Check around fueling areas.** Clear fueling areas of dry vegetation. Ground all fueling nozzles to avoid sparking a fire. Have a fire extinguisher available.
- ✓ **Check moisture content of hay.** Green hay fires are a common occurrence. Check stacks regularly; don't open a "hot stack" without adequate fire equipment on-site. Opening a stack will increase fire intensity.
- ✓ **Check all exhaust systems.** Place spark arrestors on all chimneys, stovepipes, tractors and other equipment. Hot carbon particles thrown from exhaust pipes can start a fire.
- ✓ **Be prepared when burning.** Ensure there is adequate clearance for open burning. Have fire-fighting equipment available. Check fires to make sure they are dead out before leaving the area.
- ✓ **Check welding areas.** Weld only in areas free of flammable vegetation and fuel. Have a plan for extinguishing any fire starts from sparks.
- ✓ **Check your firefighting equipment and water supply.** Always have both available and have a plan for catching any fire starts. You are the first line of defense in a wildfire.

Appendix F – Fire Safe Agroforestry

Fire... a hot button for agroforestry!

Lyn Townsend
Forester, West National Technology Support Center, Natural Resources Conservation Service, Portland, OR

HUMANS and fire have had a long history—sometimes good, sometimes not so good. According to the National Interagency Fire Center, over 96,000 fires burned nearly 10 million acres in 2006. This includes wildfires, which comprised most of the acreage, and prescribed fires. From 1999 to 2006, the average wildland fire acres burned was nearly double the average of 1960 to 1998—6.8 million versus 3.5 million acres, respectively! Why? The most likely answers are: 1) an increase in fuel loads on forest and shrub lands resulting from a lack of active fuel management in recent decades, and 2) a change in climate or climate cycles. The risk of the loss of life and property continues to increase as more and more people move into the Wildland Urban Interface (WUI)—pronounced "Wu-eee"—that fringe of wild land near suburbs or suburbs directly embedded into wildlands.

Fires are classed as either "uncontrolled" or "wild," or "controlled" or "prescribed." Of course, the latter can become the former with unexpected high winds or lack of preparation. Fire relates to agroforestry in two ways: by using agroforestry practices to control buffer against wildfire, and by protecting agroforestry practices from being damaged or killed by fire.

Wildfires can be devastating, but defensive agroforestry practices and strategic design criteria can be crucial management tools to reduce wildfire risk.

Key practices and how they address these aspects are:

- **Silvopasture** – In a silvopasture system, trees and shrubs are planted, grown, and maintained on a wide spacing with an understory that is grazed by livestock. Fuel loads are kept low, ladder fuels are nearly absent and, should a crown fire start, the trees are spaced widely enough to inhibit crown-to-crown spread, thereby minimizing the level of damage to the trees or to the adjacent non-grazed forest land. Essentially, a silvopasture acts as a "fuel break" with grazing livestock providing the built-in annual understory fuel management.
- **Riparian forest buffers, windbreaks, alley cropping, multi-story cropping** – These agroforestry practices are effective fire control techniques when fire-resistant plant species, such as many native deciduous or succulent-leaf trees, are used and the planting is strategically located so that it can prevent or at least stall the spread of fire from one area to another. Prevailing wind direction during fire season is an important planning criterion for locating the agroforestry practice. Another tactic is planting fire-resistant trees in the outer rows of multi-row plantings near homes or on the edges of small communities. Here, the trees create a "three dimensional" firebreak and could even catch firebrands that typically jump ahead and downwind during most wildfires. For row-type plantings, the outer edge near a road (which could be a fire-ignition point) can be maintained mechanically as an effective firebreak reducing the likelihood of fires spreading into and through the planting. A design criterion to consider for selecting trees and shrubs, particularly shrubs, are choosing those species with capability to resprout after fire. Even though the damage has been done, at least the shrub can regenerate quickly using the existing root system.

The area or strip near the road (far edge of windbreak) will be maintained mechanically as an effective firebreak reducing the likelihood of fires spreading into and through the planting. *Photo courtesy of USDA NRCS*

Wildfires can be devastating, but defensive agroforestry practices and strategic design criteria can be crucial management tools to reduce wildfire risk and, if fire occurs, minimize the damage.

Appendix G – Evacuation Tips

By preparing ahead, your house has a better chance of surviving a wildfire. When a wildfire is immediately threatening your area, take the following steps to protect your home.

First, if you see a fire approaching your home, report it immediately by dialing 911. Stay on the phone to answer additional questions the emergency dispatcher may ask.

Next, dress properly to prevent burns and lifelong scars. Wear long pants and cotton or wool long-sleeve shirts or jackets. Gloves and a damp cloth provide added protection. Do not wear short sleeve shirts or clothing made of synthetic fabrics.

If there is time before the fire arrives, take the following actions.

Emergency Wildfire Survival Checklist

Preparing to Evacuate

- Park your car in the garage, heading out with windows closed and keys in the ignition.
- Close the garage door but leave it unlocked; disconnect the automatic garage door opener in case of power failure.
- Place valuable documents, family mementos and pets inside the car in the garage for quick departure, if necessary.
- If you do evacuate, use your pre-planned route, away from the approaching fire front.
- Keep a flashlight, cell phone and portable radio with you at all times.
- If you are trapped by fire while evacuating in your car, park in an area of clear of vegetation, close all vehicle windows and vents, cover yourself with a blanket or jacket and lie on the floor.
- If you are trapped by fire while evacuating on foot, select an area clear of vegetation along a road. Cover any exposed skin with a jacket or blanket. Avoid canyons that can concentrate and channel fire.

Outside Your Home

- Move combustible yard furniture away from the house or store it in the garage; if it catches fire while outside, the added heat could ignite your house.
- Cover windows, attic openings, eave vents, and sub-floor vents with fire resistive material such as 1/2 inch or thicker plywood. This eliminates the possibility of sparks blowing into hidden areas within the house. Close window shutters if they are fire resistive.
- Attach garden hoses to spigots and place them so they can reach any area of your house.
- Fill trash cans and buckets with water and locate them where firefighters can find them.
- If you have an emergency generator or a portable gasoline-powered pump that will supply water from a swimming pool, pond, well, or tank, clearly mark its location and make sure it is ready to operate.
- Place a ladder against the house on the side opposite the approaching fire to help firefighters to rapidly get onto your roof.
- Place a lawn sprinkler on flammable roofs, but don't turn it on unless the fire is an immediate threat. You do not want to reduce the supply of water for the firefighters.

Inside Your Home

- Close all windows and doors to prevent sparks from blowing inside.
- Close all doors inside the house to slow down the spread of fire from room to room
- Turn on a light in each room of your house, on the porch, and in the yard. This will make the house more visible in heavy smoke or darkness.
- Fill sinks, bathtubs, and buckets with water. These can be important extra water reservoirs.

Appendix H – Plan Locations

Umatilla County Emergency Management
915 SE Columbia Drive
Hermiston, OR 97838

Umatilla County Planning Department
216 SE 4th Street
Pendleton, OR 97801

Oregon Department of Forestry
Pendleton Unit
1055 Airport Road
Pendleton, OR 97801

Confederated Tribes of the Umatilla
Emergency Services
Confederated Way (off of Mission Road)
Community of Mission on Reservation

Located on Umatilla County Website at www.co.umatilla.or.us

2017

Mill Creek and Walla Walla County Community Wildfire Protection Plan Update

Blue Creek Fire 2015

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Acknowledgments

Thank you to the Community Wildfire Protection Plan Steering Committee who dedicated their time and effort to every aspect of this project. This Community Wildfire Protection Plan represents the efforts and cooperation of many working together to improve preparedness for wildfire and reduce community risk factors.

Walla Walla County Conservation District

KOOSKOOSKIE COMMONS

Walla Walla County Fire District #1
Walla Walla County Fire District #2
Walla Walla County Fire District #3
Walla Walla County Fire District #4
Walla Walla County Fire District #5
Walla Walla County Fire District #6
Walla Walla County Fire District #7
Walla Walla County Fire District #8

Unincorporated Communities
&
The Local Businesses and Citizens of Walla Walla County

To obtain copies of this plan contact:

Walla Walla County Emergency Management
Liz Jessee, Emergency Management Director
27 North 2nd Ave.
Walla Walla, Washington 99362
Office: 509-524-2900
Desk: 509-524-2902
Fax: 509-524-2910

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Table of Contents

Signature Pages

Walla Walla County Commissioners & City of Walla Walla

This Walla Walla County Community Wildfire Protection Plan has been developed in cooperation and collaboration with representatives of the following organizations and agencies.

absent — —

James K. Johnson — Date

Walla Walla County Commissioner, District 1

9/11/17

Todd L. Kimball, — Date

Walla Walla County Commissioner, District 2

9-11-2017

James L. Duncan, Chairman — Date

Walla Walla County Commissioner, District3

12 July 2017

Allen Pomraning, Mayor — Date

City of Walla Walla Mayor

25-Oct-2017

Gerry Day, State Forester — Date

Washington Department of Natural Resources

11-22-17

Joe Hessel, District Forester — Date

Oregon Department of Forestry

Signatures of Participation by Walla Walla County Fire Protection Districts and Departments

`This Community Wildfire Protection Plan and its components identified herein were developed in close cooperation with the participating entities listed. These members of the CWPP steering committee formally recommended that this document be adopted by the Walla Walla County Commissioners.

Brent Tompkins, Chief
Walla Walla County F. P. D. #1
Date: 10-20-17

Jim Callahan, Chief
Walla Walla County F. P. D. #2
Date: 8-28-17

Jim Ruffcorn, Chief
Walla Walla County F.P.D. #3
Walla Walla County F.P.D. #7
Date: 8-28-17

Rocky Eastman, Chief
Walla Walla County F.P.D. #4
Date: 8-28-17

Michael Wickstrom, Chief
Walla Walla County F.P.D. #5
Date: 9-28-2017

Larry Heator, Chief
Walla Walla County F.P.D. # 6
Date: 8-28-2017

Bob Clendaniel, Chief
Walla Walla County F.P.D. # 8
Date: 9/18/2017

Signatures of Participation by other Walla Walla County CWPP Steering Committee Entities

This Community Wildfire Protection Plan and its components identified herein were developed in close cooperation with the participating entities listed. These members of the CWPP steering committee formally recommended that this document be adopted by the Walla Walla County Commissioners.

Mori Struve — 12-11-2017

Mori Struve, City of Walla Walla
Public Works Operations Manager
Date

12/8/17

Matt Hoehna
Oregon Department of Forestry
Date

9/20/17

Matthew James
U.S. Forest Service
Date

10/10/17

Devin Parvinen
Washington DNR
Date

September 18.2017

Renee Hadley
Walla Walla County Conservation District
Date

12-11-2017

Liz Jessee
Walla Walla County Emergency Management
Director
Date

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Chapter 1

Introduction

Plan Overview and Development

The process of developing a Community Wildfire Protection Plan (CWPP) can help a community clarify and refine its priorities for the protection of life, property, critical infrastructure, and ecosystem services in the wildland–urban interface on both public and private land. It also can lead community members through valuable discussions regarding management options and implications for the surrounding land base. Local fire service organizations help define issues that may place the city, county, communities, and/or individual homes at risk. Through the collaboration process, the CWPP steering committee discusses potential solutions, funding opportunities, and regulatory concerns in order to document their resulting recommendations in the CWPP. The CWPP planning process also incorporates an element of public outreach. Public involvement in the development of a CWPP not only facilitates public input and recommendations, but also provides an educational opportunity through interaction of local wildfire specialists and an interested public.

*The **Mill Creek and Walla Walla County Community Wildfire Protection Plan** was developed in 2017 by the Mill Creek & Walla Walla County CWPP committee, the City of Walla Walla, and the Oregon Department of Forestry, with project facilitation and support provided by Northwest Management, Inc. of Moscow, Idaho. Funding for the project was provided by the City of Walla Walla, Walla Walla County Emergency Management Department, and Oregon Department of Forestry. This Community Wildfire Protection Plan will be reviewed annually and updated at least every five years starting from the year of adoption. The Community Wildfire Protection Plan was developed in compliance with the Federal Emergency Management Agency requirements for a wildfire mitigation plan.*

The idea for community-based wildland fire planning and prioritization is neither novel nor new. However, the incentive for communities to engage in comprehensive forest planning and prioritization was given new and unprecedented incentives with the enactment of the Healthy Forests Restoration Act (HFRA) in 2003. This landmark legislation includes the first meaningful statutory incentives for the US Forest Service (USFS) and the Bureau of Land Management (BLM) to give consideration to the priorities of local communities as they develop and implement forest

management and hazardous fuel reduction projects. For or a community to take full advantage of this new opportunity, it must first prepare a complete CWPP.

A countywide CWPP steering committee proposes general project recommendations based on overall wildfire risk, rather than focusing on individual landowners or organizations. Once the CWPP is approved by the City of Walla Walla, Walla Walla County Commissioners and the State Forester the steering committee will further refine the proposed projects, their feasibility, and continue public outreach as they use the document to seek funding for desired projects.

In 2017 the City of Walla Walla contracted with Northwest Management, Inc. (NMI) to conduct an in-depth wildfire risk assessment for the County. Funding for this project was provided by the Oregon Department of Forestry (ODF), City of Walla Walla, and the Walla Walla County Emergency Management Department.

Wildfire occurs on an annual basis in Walla Walla County; thus, programs and projects that mitigate the impacts of this hazard are a benefit to residents, property, infrastructure, and the local economy. In December of 2016 the City of Walla Walla and ODF met with the CWPP Steering Committee to define their plans for updating the previous CWPP completed in 2006.

This new CWPP was intended to cover the Mill Creek Watershed and the entirety of Walla Walla County. It is the result of professional collaboration, analysis, wildfire risk mapping and other factors intended to reduce the threat of wildfire to people, structures, and infrastructure throughout the County, as well as provide a plan to address concerns for the Mill Creek watershed as the primary source of drinking water for the City of Walla Walla. Agencies and organizations that participated in the planning process include:

- Communities of Walla Walla, Touchet, Prescott, Waitsburg and Burbank
- Walla Walla County Citizens
- Walla Walla County Fire District #1, #2, #3, #4, #5, #6, #7, #8
- Walla Walla County Emergency Management Department
- Walla Walla County Conservation District
- Whitman College
- Washington Department of Natural Resources

- Oregon Department of Forestry
- U.S. Forest Service

NMI assisted the steering committee by facilitating meetings, conducting assessments, authoring the document, and ensuring compliance of the final documents to Federal and State standards. The guiding references for development and compliance of this CWPP are discussed in the following descriptions.

State and Federal Compliance

This CWPP includes compatibility with FEMA requirements for a Hazard Mitigation Plan, adherence to the guidelines of the National Fire Plan, and those set forth in the Healthy Forests Restoration Act (2003) as noted below.

- The National Fire Plan: A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan (December 2006).
- The Integrated Rangeland Fire Management Strategy (2015).
- Healthy Forests Restoration Act (2003).
- National Cohesive Wildland Fire Management Strategy (March 2011).
- The Federal Emergency Management Agency's Region 10 guidelines for a Local Hazard Mitigation Plan as defined in 44 CFR parts 201 and 206, and as related to a fire mitigation plan chapter of a Multi-Hazard Mitigation Plan.
- National Association of State Foresters – guidance on identification and prioritizing of treatments between communities (2003).

The objectives of combining these complementary guidelines was to facilitate an integrated wildland fire risk assessment, identify pre-hazard mitigation activities, and prioritize activities and efforts to achieve the protection of people, structures, the environment, and significant infrastructure in Walla Walla County while facilitating new opportunities for pre-disaster mitigation funding and cooperative projects. In addition, this document is intended to be complementary to existing plans of surrounding counties and purposely modeled after the Union County, Oregon CWPP.

Wildfire and the U.S. Government Accountability Office

Since 1984, wildland fires have burned more than 850 homes each year in the United States and as more people move into fire-prone areas bordering wildlands this number is likely to increase. The responsibility of preventative measures to protect homes lies with each individual homeowner. Between 2003 and 2013 there were seven years that saw the largest property-loss wildland fires in the United States, with five of these fires causing more than $400 million in damage.[1]

The United States Government Accounting Office (GAO) was asked to assess, among other issues, measures that can help protect structures from wildland fires, (2) factors affecting use of protective measures, and (3) the role technology plays in improving firefighting agencies' ability to communicate during wildland fires.

According to the GAO the two most effective mitigation efforts for protecting structures from wildland fire are: (1) creating and maintaining a buffer, called defensible space, from 30 to 100 feet wide around a structure, where flammable vegetation and other objects are reduced; and using fire-resistant roofs and vents. In addition to roofs and vents, other technologies such as fire-resistant windows and building materials, surface treatments, sprinklers, and geographic information systems mapping can help in protecting structures and communities, but these play a secondary role.

Although protective measures are available, many property owners have not adopted them because of the time or expense involved, competing concerns such as aesthetics or privacy, misconceptions about wildland fire risks, and lack of awareness of their shared responsibility for fire protection. Federal, state, and local governments, as well as other organizations, are attempting to increase property owners' use of protective measures through education, direct monetary assistance, and laws requiring such measures. In addition, some insurance companies have begun to direct property owners in high risk areas to take protective steps[2].

Update and Review Guidelines

[1] National Fire Protection Association Fire Analysis and Research Division. Large-Loss Fires in the United States 2013. NFPA No. LLS10. November 2014.

[2] United States Government Accountability Office. Technology Assessment – Protecting Structures and Improving Communications during Wildland Fires. Report to Congressional Requesters. GAO-05-380. April 2005.

1. *Deadlines and Requirements for Regular Plan Reviews and Updates*: In order to apply for a FEMA Pre- Disaster Mitigation (PDM) project grant or to receive Hazard Mitigation Grant Program (HMGP) funding for disasters declared on or after November 1, 2004, Tribal and local government entities must have a FEMA- approved mitigation plan. Additionally, this CWPP must be approved by County officials in order to qualify for non-emergency Stafford Act assistance (i.e., Public Assistance Categories C-G, HMGP, and Fire Management Assistance Grants) for disasters declared on or after November 1, 2004. State mitigation plans must be reviewed and reapproved by FEMA every three years. Local Mitigation Plans such as this CWPP must be reviewed and reapproved by FEMA every five years.
2. *Plan updates*. In addition to the timelines referenced above, the Rule includes the following paragraphs that pertain directly to the update of State and local plans,
3. §201.3(b)(5) [FEMA Responsibilities] …Conduct reviews, at least once every three years, of State mitigation activities, plans, and programs to ensure that mitigation commitments are fulfilled…
4. §201.4(d) Review and updates. [State] Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities and resubmitted for approval…every three years.
5. §201.6(d) [Local] plans must be reviewed, revised if appropriate, and resubmitted for approval within five years in order to continue to be eligible for…project grant funding.
6. Plan updates must demonstrate that progress has been made in the past three years (for State plans), or in the past five years (for local plans), to fulfill commitments outlined in the previously approved plan. This will involve a comprehensive review and evaluation of each section of the plan and a discussion of the results of evaluation and monitoring activities detailed in the Plan Maintenance section of the previously approved plan. FEMA will leave to State discretion, consistent with this plan update guidance, the documentation of progress made. Plan updates may validate the information in the previously approved plan or may involve a major plan rewrite. In any case, a plan update is NOT an annex to the previously approved plan; it must stand on its own as a complete and current plan.

Summary

This Mill Creek / Walla Walla County CWPP update has been developed in accordance with the guidelines set forth by Federal regulation as well as input from the planning committee, public stakeholder meetings, and collaborative partners. This document was modeled after the neighboring Union County, Oregon CWPP, in an effort to unify adjacent jurisdictions for mitigation strategies and fire risk management of the Mill Creek Watershed.

Chapter 2

Mission, Goals and Objectives

The goals of the planning process include integration with the National Fire Plan, the Healthy Forests Restoration Act (HFRA), the Cohesive Wildland Fire Management Strategy (CWS), and the Disaster Mitigation Act. The plan utilizes the best and most appropriate science from all partners as well as local and regional knowledge about wildfire risks and fire behavior while meeting the needs of local citizens and recognizing the significance wildfire can have on the regional economy.

Wildfire frequency, geographic extents, and severity have been increasing significantly over the last few decades, in part because of past management decisions that have led to increased fuels across the landscape, and in part to by a changing climate (Westerling, Hidalgo, Cayan, & Swetnam, 2006). In addition to the changes of wildfire activity, expansion of development in rural areas has increased the exposure of property, human life, and economic loss from wildfires. There is a need to assess the Wildland Urban Interface (WUI), where the natural environment meets human development, to understand the increasing risks we face in these areas. The goals of the CWS first seek to reduce the risk associated with wildfire to human life through risk management and public education about property mitigation efforts. Secondly, the CWS addresses the need to manage the landscape across multi-jurisdictional ownership boundaries to increase the resilience of the landscape to wildfires.

Overlooking ownership boundaries in accordance with the current strategies of the CWS, HFRA, etc. the WUI assessments within this plan have been consolidated into specific Wildland Urban Interface Zones (WUIZ), allowing for the identification, assessment and treatment/mitigation of high risk locations. This approach enables the communities to prioritize threats and apply mitigation efforts and grant monies more effectively and economically. This plan seeks to utilize the steps set forth by CWS and other National documents to improve the effectiveness of suppression teams, identify risks, educate homeowners and communities, and provide recommendations for mitigation efforts. The goals and objectives have been outlined by the planning committee and progressed through community collaboration and input. Outlined below are the goals of this plan broken into three categories; Identify Risks, Public Outreach, and Recommendations, with specific objectives under each goal.

Mission Statement

The mission of this plan is to assess wildfire hazards in and around the Mill Creek Drainage and Walla Walla County, and to identify options for reducing the risk of wildfire within the planning area and mitigate the impacts if a fire does occur.

Goals and Objectives

Identify Risk

Identify and map Wildland Urban Interface (WUI) boundaries.

Prioritize the protection of people, structures, infrastructure, natural resources, and unique ecosystems that contribute to our way of life and the sustainability of the local and regional economy.

Identify areas of inadequate fire protection, such as gaps in district coverage, and identify solutions.

Meet or exceed the requirements of the National Fire Plan and FEMA for a county level Community Wildfire Protection Plan.

Outreach

Educate communities about the unique challenges of wildfire in the wildland-urban interface.

Identify regulatory measures such as building codes and road standards specifically targeted to reduce the wildland fire potential and reduce the potential for loss of life, damage to property and the environment.

Provide a plan that balances private property rights of landowners in Walla Walla County with personal safety and responsibility.

Improve County and local fire agency eligibility for funding assistance (National Fire Plan, Healthy Forest Restoration Act, FEMA, and other sources) to reduce wildfire hazards, prepare residents for wildfire situations, and enhance fire agency response capabilities.

Recommendations

Improve fire service organizations' awareness of wildland fire threats, vulnerabilities, and mitigation opportunities or options.

Address structural ignitability and recommend measures that homeowners and communities can take to reduce the ignitability of structures

Identify additional strategies for private, state, and federal lands to reduce hazardous fuel conditions and lessen the life safety and property damage risks from wildfires.
Identify and evaluate hazardous fuel conditions, prioritize areas for hazardous fuel reduction treatments, and recommend the types and methods of treatment necessary to protect communities.

Provide opportunities for meaningful discussions among community members and local, state, and federal government representatives regarding their priorities for local fire protection and forest management.

Chapter 3

Wildland Urban Interface Planning

Wildland-Urban Interface in Walla Walla County

Walla Walla County is located in the southern portion of the Palouse region of Washington that is prime agricultural lands. Large tracts of property are dedicated to agriculture, primarily wheat, throughout the County with dispersed sagebrush steppe and Conservation Reserve Program (CRP) lands intermixed. The City of Walla Walla accounts for the majority of the population with over 54 percent of the County's residents. Housing outside of Walla Walla proper is dispersed with an average of 43 people per square mile.

The (WUI) is defined as areas where residential housing and undeveloped wildland vegetation interact (Radeloff et al., 2005). Developments tend to be in areas where natural aesthetics are high and access and response times of emergency services are poor. While the USDA uses a broad-brush approach in defining the WUI as communities and residences that are near Federal lands that have a high risk of wildfire, state and local governments are able to provide a much more detailed inventory of communities and residences at risk of wildfire.

The Healthy Forests Restoration Act makes a clear designation that the location of the WUI is at the determination of the county or reservation when a formal and adopted Community Wildfire Protection Plan is in place. It further states that the federal agencies are obligated to use this WUI designation for all Healthy Forests Restoration Act purposes. The Walla Walla County Community Wildfire Protection Plan planning committee has evaluated a variety of different approaches to determining the WUI for the County and selected a WUI Zone approach. In addition to a formal WUI map for use by federal agencies, it is the goal that these maps will serve as a planning tool for the county, the state and local Fire Protection Districts.

In following this approach the planning committee identified five different wildland urban interface zones (WUIZ) given unique circumstances within each for wildfire mitigation and/or suppression efforts. The WUIZs are not indicative of a priority classification as each is equally valuable and in need of specific resources and activities. The WUIZ is a planning tool showing where homes, businesses, and critical environmental services are located and the density of

those structures leading to identified WUI categories. The methods used for these maps are repeatable and easily updated to help communities adapt and plan into the future.

Some priority areas south of the County in Oregon, but outside of the Mill Creek Watershed, have been included to highlight potential risk to the watershed and Walla Walla County from surrounding fire risk areas (Figure 1). The threat, risk and vulnerability analysis posed by these areas are outside the scope of this document, however the planning committee felt it was in the County's best interest to identify this area for County residents given the potential for wildfires to originate in this zone and threaten Walla Walla and the Mill Creek Watershed. The WUIZ details for this area and risk assessments can be found in the Union County Oregon CWPP for anyone interested in further understanding the potential risks of this area for Walla Walla County and the Mill Creek Watershed. Wildland Urban Interface Zones were delineated by the committee to address fire frequency, emergency service response time, and highlight critical infrastructure. A key component in meeting the underlying need for protection of people and structures is the protection and treatment of hazards in the WUI. The WUI encompasses not only the interface (areas immediately adjacent to urban development), but also the surrounding vegetation and topography. Reducing the hazard

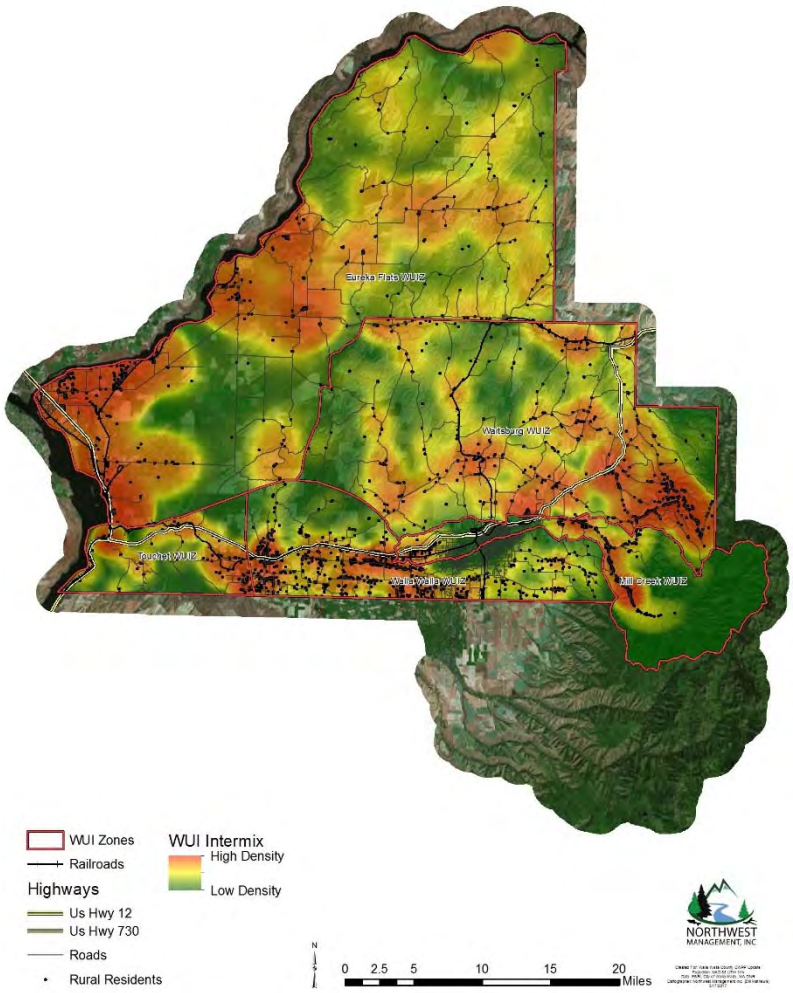


Figure 1. Map of Walla Walla County and the Mill Creek Watershed that identifies the Wildland Urban Interface (WUI) zones and risk ratings for County consideration. The lower portion of the map represents an area in Umatilla County, Oregon that was deemed to present a significant risk of fire to the residents and infrastructure of Walla Walla County and the Mill Creek Watershed. This area was not assessed for fire risk in this CWPP, however details of risk, resources and threat within this area can be found in the Umatilla County, Oregon CWPP currently available in the Oregon State website

in the WUI requires the efforts of federal, state, and local agencies as well as private individuals.[3] "The role of [most] federal agencies in the wildland-urban interface includes wildland firefighting, hazard fuels reduction, cooperative prevention and education, and technical experience. Structural fire protection [during a wildfire] in the wildland- urban interface is [largely] the responsibility of tribal, state, and local governments". Property owners therefore share the responsibility of providing protection to their residences and businesses in order to minimize the threats fire poses and to create defensible areas and apply additional precautions to minimize the risk to their structures. With treatment, a WUI can provide firefighters a defensible area from which to suppress wildland fires or defend communities against loss and be a first line of defense against conditions like a crown fire that either enters the area or originates within it. [4]

By reducing hazardous fuel loads, ladder fuels, and tree densities landowners and managers can create reinforced defensible spaces using the biological resources of an area and adjacent property owners to:

- Minimize the potential of high-severity ground or crown fires entering or leaving the area;
- Reduce the potential for firebrands (embers carried by the wind in front of the wildfire) to spread fire within the WUI and compound damages. Research indicates that flying sparks and embers (firebrands) from a crown fire can ignite additional wildfires as far as 1¼ miles away during periods of extreme fire weather and fire behavior;[5]
- Improve defensible space in the immediate areas needed for suppression efforts in the event of wildland fire.

In order to prioritize efforts, there are three wildland-urban interface condition classes that have been identified by the federal government (Federal Register 66(3), January 4, 2001) for use in wildfire control efforts. These include the Interface Condition, Intermix Condition, and Occluded Condition. Each of these are described as follows:

- **Interface Condition** – a situation where structures abut wildland fuels. There is a clear line of demarcation between the structures and the wildland fuels along roads or back fences. The development density for an interface condition is usually 3+ structures per acre;

[3] Norton, P. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment. Fish and Wildlife Services, Bear Valley Wildlife Refuge. June 20, 2002.

[4] Norton, P. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment. Fish and Wildlife Services, Bear Valley Wildlife Refuge. June 20, 2002.

[5] McCoy, L. K., et all. Cerro Grand Fire Behavior Narrative. 2001.

- **Intermix Condition** – a situation where structures are scattered throughout a wildland area. There is no clear line of demarcation; the wildland fuels are continuous outside of and within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres; and

- **Occluded Condition** – a situation, normally within a city, where structures abut an island of wildland fuels (park or open space). There is a clear line of demarcation between the structures and the wildland fuels along roads and fences. The development density for an occluded condition is usually similar to that found in the interface condition and the occluded area is usually less than 1,000 acres in size.

In addition to these classifications established in the Federal Register, Walla Walla County has included four additional classifications to provide additional detail on County-specific conditions:

- **Rural Condition** – a situation where the scattered small clusters of structures (ranches, farms, resorts, or summer cabins) are exposed to wildland fuels. There may be miles between these clusters.

- **Ecological Services Areas –** areas that are outside human development but are critical to the infrastructure of the communities that they serve. Considered part of the WUI for analysis and mitigation efforts, despite the lack of structures.

- **High Density Urban Areas** – those areas generally identified by the population density consistent with the location of incorporated cities, however, the boundary is not necessarily set by the location of city boundaries or urban growth boundaries; it is set by very high population densities (more than 7-10 structures per acre).

- **Non-WUI Condition** – a situation where the above definitions do not apply because of a lack of structures in an area or the absence of critical infrastructure. This classification is not considered part of the wildland urban interface.

Interface WUI conditions for Walla Walla County were identified through the creation of a dataset based on identified structures at the edge of urbanized areas, and those outside city limits where a clear line of demarcation could be found between wildland fuels and urban areas. Intermix WUI conditions were identified using a GIS based kernel density of populations within

each individual WUIZ. Focusing on each individual WUIZ rather than the entire project area allowed for the visualization of relative populations densities within each zone.

Following dataset organization, a GIS-based kernel density population model that uses object locations and statistical analysis was applied to produce concentric rings or areas of consistent density around urban areas to facilitate visualization of the WUI fire risk areas. To graphically identify relative population density across the County, structure locations are used as an estimate of population density. The resulting output identified the extent and level of population density throughout the County. By evaluating structure density in this way, WUI areas can be identified on maps by using mathematical formulae and population density indices. The resulting population density index is then used to create concentric circles showing high density areas, interface, and intermix condition WUI, as well as the rural condition WUI, as defined above. This portion of the analysis allows us to "see" where the highest concentrations of structures are located in reference to relatively high-risk landscapes, limiting infrastructure, and other points of concern.

Potential WUI Treatments and Approaches

The identification and mapping of the WUI requires the creation of a planning tool to identify where structures, people, and infrastructure are located in reference to each other. This analysis does not include a component of fuels risk. There are a number of reasons to map and analyze these two components separately (population density vs. fire risk analysis). Primary among these reasons is the fact that population growth often occurs independent from changes in fire risk, fuel loading, and infrastructure development. Thus, making identification of the WUI dependent on all of them would eliminate populated places with a perceived lower level of current fire risk, which may not be the case in time due to forest health issues or other factors.

By examining these aspects separately, the planner can evaluate layers of information to identify where population density overlays areas of high current relative fire risk and then propose mitigation actions to reduce the fuels, improve readiness, directly address factors of structural ignitability, improve initial attack success, mitigate resistance to control factors, or (more often) a combination of these and other approaches.

It should not be assumed that an area identified as being within the WUI will automatically qualify it for treatment on this factor alone. Nor should it be assumed that all WUI area treatments

should be treated with the same prescription. Instead, each location targeted for treatment must be evaluated on its own merits: factors of structural ignitability, access, resistance to control, population density, resources and capabilities of firefighting personnel, and other site-specific factors.

It should also not be assumed that WUI designation on national or state forest lands automatically equates to a treatment area. The Forest Service, Bureau of Land Management, and Washington Department of Natural Resources are obligated to manage lands under their control according to the standards and guidelines listed in their respective forest or resource management plans (or other guidance documents). The adopted forest plan has legal precedence over the WUI designation until such a time as the forest plan is revised to reflect updated priorities.

Before treatments can be applied many tasks will be preceded by a site or home evaluation, to identify the specific factors of structural ignitability (roofing, siding, deck materials) and vegetation within the treatment area to be considered. However, treatments in less populated areas and on rural lands may be more focused on access (two ways in and out of a location) and communications through means other than land-based telephones. Conversely, a subdivision with closely spaced homes surrounded by forest and underbrush, may receive more time and effort implementing fuels treatments beyond the immediate home site to reduce the probability of a high-intensity fire entering the subdivision.

Walla Walla County Plan Priorities

In accordance with the federal CWS, this plan's prioritization of mitigation efforts across jurisdictional boundaries is an effort to protect: first, to protect firefighter and emergency personnel life; and second, to provide protection of infrastructure and ecologically important areas. Mitigation projects laid out by this plan provide suggested best management approaches to accomplishing these goals; addressing wildfire risk throughout the County and the Mill Creek Watershed, and, aiding in the acquisition of funding that can improve the County's ability to increase resilience in the face of wildfire risk.

CWPP Committee Members

The City of Walla Walla and Walla Walla County Emergency Management Department along with Oregon Department of Forestry (ODF) provided funding for the CWPP and were active members of the planning committee. Other entities that were involved in the planning committee included; U.S. Forest Service, Natural Resources Conservation Service, Walla Walla Fire Districts, Washington DNR, and representatives from various communities throughout the County. Monthly planning meetings were held from December of 2016 through June of 2017, with multiple community outreach projects throughout the planning process.

Wildfire Preparedness Resources

Walla Walla County

Walla Walla County Emergency Management uses and maintains, an emergency notification system (ENS) from Everbridge. The emergency notification system alerts residents about severe weather, fires, floods, toxic environmental issues, radiological events and other emergencies. Effective in 2017, WWEM has acquired IPAWS/WEA capability and is able to use the Everbridge ENS to communicate alerts and notifications over the Integrated Public Alert and Warning System (IPAWS). Messages can be sent to residents on any communication path desired – cell phone, home phone, email, text messaging, fax, pager, PDA and more – ensuring that residents receive life-saving emergency information and important public service announcements in minutes. Citizens listed in the County's white-pages landline phone database will be automatically subscribed to emergency alerts by phone, though any citizen may also self-register their cell phone, VOIP phone, email, text message device, fax, and pager at www.wwemd.info.

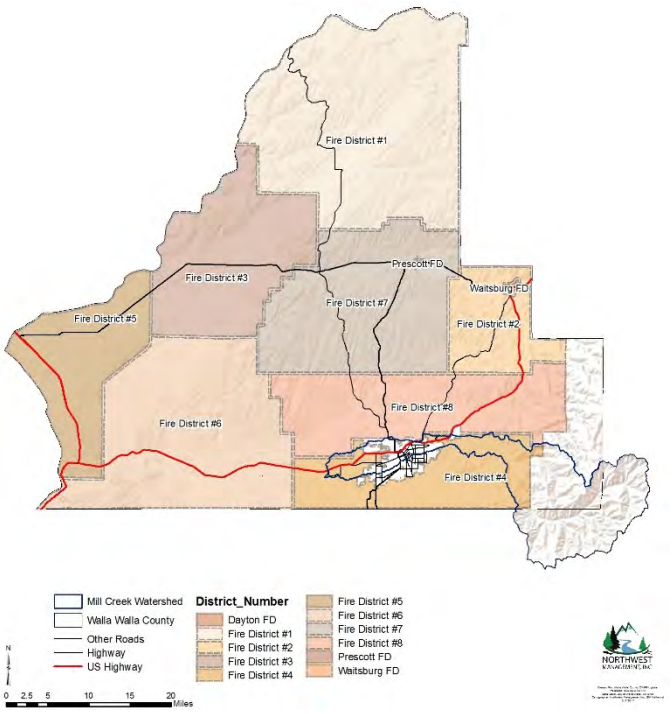


Figure 2 Walla Walla County Fire Districts (WWFD) map detailing the jurisdictional boundaries of each district. The Blue Mountains, Southeastern portion of the map, is serviced by WA DNR, and U.S. Forest Service, with a mutual aid agreement from WWFD #4 & #8.

The notification system allows Emergency Managers to notify citizens based on a geographical area designated by Emergency Management Services.

Burn control for residential burns within Walla Walla County is regulated by the Burn Control Officer. Burns greater than 3' X 3' and over 2' in height (Recreational Burns) require a permit and are subject to daily burn decisions. Agricultural burns are regulated by Washington State Department of Ecology. Requirements for Agricultural burns are: 1) Only natural vegetation can be burned in any outdoor fire, 2) someone must be monitoring the fire at all times with a water source available to control the burn, 3) fire must be extinguished immediately if it becomes a public safety hazard, nuisance or interferes with the right of a person to enjoy their property.

Mill Creek Watershed

The Mill Creek Watershed plays a vital role to the citizens of Walla Walla and surrounding communities as the main provider of drinking water. Currently Washington DNR is extending the shaded fuel break along portions of the watershed's westerly perimeter. Pre-planning of additional mitigation efforts is vital to the sustained ecosystem service that Mill Creek delivers to the residents of Walla Walla. Coordinated efforts between the Federal, State and the CWPP committee is necessary to maximize the effort and expenditures to protect the watershed. The watershed encompasses over 36 square miles and has roughly 300 residences within its borders, primarily located along Mill Creek Road. Washington DNR, US Forest Service, and Oregon Department of Forestry all share responsibility for suppression within the watershed boundary with support from local Fire Districts #4 and #8. Due to designated roadless area fuels management and suppression efforts within the watershed are difficult and expensive both in monetary and labor cost. During the risk analysis, satellite imagery identified 37 fires within the boundary of the watershed from 2000 to 2017.

The USFS employs one full time employee at the Table Rock Lookout during the fire season to ensure quick response to ignition within the watershed. Located on Forest Road 475 east of the Watershed in the Umatilla National Forest, it's unique position and elevation offer an unobstructed view into the Mill Creek Watershed. The City of Walla Walla also employs one full time employee as a Mill Creek Watershed Attendant. Funding for another seasonal worker hired through the Forest Service is provided by the City of Walla Walla. Oregon Department of Forestry has responsibility for the portion of the watershed that extends into Oregon and USFS shares responsibility on Federal lands in both Washington and Oregon. Walla Walla County Fire

Districts #4 & #8 share responsibility for fire suppression in and around the watershed boundaries within the County boundary.

Walla Walla County Fire District #1

District Summary: Fire District #1 is the largest District in the County covering 310 square miles. It currently has only 90 residents and contains large areas of CRP consisting of sage brush and natural vegetation, and very few natural fire breaks. As with most Fire Districts in the County, District #1 relies on volunteer fire personnel and has experienced difficultly in recruiting and retaining firefighters who are reliably able to respond to calls.

Being an agricultural area, there is a daily influx of seasonal workers and with this volume of traffic and resource use comes an increase in the potential for more human caused fires during the summer and fall.

District Needs: Fire District #1 needs updated trucks, more volunteers in rural areas and new or improved fire breaks in large CRP tracks of ground.

Walla Walla - Columbia County Fire District #2:

***District Summary*:** Fire District #2 located in and around Waitsburg, Washington provides fire and EMS services to both Walla Walla County and Columbia County. This area covers over 66 square miles in Walla Walla County and is mostly rural farmlands.

***Residential Growth*:** Most residential growth is taking place within the city limits.

***Communications*:** Need to improve coverage of some areas of the District due to terrain dead spots.

***Education and Training*:** At this time, the District is working with chiefs in the surrounding districts and the cities of Walla Walla and College Place to jointly train and share knowledge and experience on wildland and structural firefighting techniques.

Cooperative Agreements: Fire District #2 has mutual aid agreements with districts and municipalities in Columbia, Walla Walla, Benton, and Franklin Counties.

***District Needs*:** Expansion of the existing station or construction of a new station for staff and resource space and function.

Current Resources: The resources of this District include in Table 1 below.

Table 1 Walla Walla County Fire District #2 Inventory List

Type	Description	Tank Capacity	Pump Capacity
Equipment	Fire Engine (Type II) (Pumper)	1000 Gal	1500 GPM
Equipment	Fire Engine (Type II) (Pumper)	750 Gal	1250 GPM
Equipment	2002 Fire Engine (Type III)	1275 Gal	300 GPM
Equipment	1994 Fire Engine (Type III)	1050 Gal	300 GPM
Equipment	2005 Fire Engine (Type V)	400 Gal	300 GPM
Equipment	2001 Fire Engine (Type V)	550 Gal	150 GPM
Equipment	Water Tender (Type II) (Tanker)	3280 Gal	850 GPM
Equipment	Water Tender (Type II) (Tanker)	2500 Gal	300 GPM
Equipment	Water Tender (Type III) (Tanker)	1800 Gal	300 GPM
Equipment	Water Tender (Type III) (Tanker)	1600 Gal	300 GPM
Equipment	1994 Aid Vehicle (Limited – Rescue Vehicle)	AID	
Equipment	Ambulance (Type IV) (Ground)	BLS	
Equipment	Ambulance (Type IV) (Ground)	BLS	

Walla Walla County Fire District #3

District Summary: Fire District #3 encompasses 137 square miles and includes 775 residents. It contains large areas of CRP with very few natural fire breaks.

Issues of Concern: Every year it gets harder to find firefighters who are consistently able to respond to calls. Being an agricultural area, there is a daily influx of seasonal workers that increases the potential for more human caused fires during the summer and fall.

District Needs: Fire District #3 needs updated trucks, more volunteers in the rural areas and new or improved fire breaks in many of the large CRP tracks of ground.

Walla Walla County Fire District #4

***District Summary*:** Walla Walla County Fire District #4 protects an area of approximately 125 square miles surrounding the cities of Walla Walla and College Place, serving a population of approximately 9,500 residents. Located within the District are heavily populated residential areas, commercial and industrial complexes, educational facilities, agricultural areas, wildland areas, and complex zones of interfaces between urban and wildland/agriculture uses. To provide timely service to this diverse area, there are currently five fire stations strategically located to provide efficient protection.

Operating as a combination fire department, District #4 has 10 career staff and 65 dedicated volunteer firefighters, officers, EMT's, First Responders, and support personnel. The equipment utilized by the department is included in Table 2. Inventory of Equipment for Fire District #4 Walla Walla County. The District average's 725 calls for service yearly, with 60 percent of those calls for EMS services and the remainder for fire. The District is comprised of a significant wildland urban interface area with many permanent homes and critical infrastructure contained within its boundaries. Additionally, we have large areas of wheat which poses a high fire danger during the summer months. The potential for the District to host a substantial wildland fire is high.

Issues of Concern

***Wildland Urban Interface and Residential Growth*:** The fire District has many permanent homes in the WUI and each year the WUI is being expanded in size and complexity as more homes are built. Defensible space and fire adapted community conditions are extremely important for the safety of these homes along with the safety of the residents and our firefighters. However, at times, it is challenging to motivate home and property owners to take the initiative to make their home better prepared to withstand a wildland fire.

Creating fire breaks on lands within the Conservation Reserve Program (CRP) is one goal for area fire chiefs. We have had several large fires on CRP lands due to large tracts of continuous fuels with no natural or manmade fire breaks.

***Communications*:** The District is part of a County- wide Dispatch center (WESCOM) that is responsible for dispatching all fire (both city and county) and police (both city and county) personnel as Well as City of College Place fire department resources. Within the past year,

WESCOM has increased its service to Columbia County Fire Districts 1 & 3 and parts of Umatilla County in Oregon by utilizing a single Computer Aided Dispatch (CAD) system for all parties. WESCOM has a rather sophisticated, intricate, and somewhat temperamental – repeater simulcast micro wave system. Although the system has gone through a major equipment update and fine tuning, the service area due to topography continues to have areas where radio communications between Dispatch and Fire/EMS responders is difficult or impossible.

***Residential and Agricultural Burning*:** Provide education to County residents on the process of conducting and/or requesting permits for the four types of fires permitted within the County; recreational burns, fence line burns, residential burns and bonfires. Each burn type has specific requirements with regards to permitting, time, location and with respect to the rights of others. Provide education to agricultural producers on Washington State Department of Ecology regulations and permit requirements required to safely conduct agricultural burns within Walla Walla County.

Other: As with most volunteer agencies, The District continues to seek ways to improve its ability to recruit and retain good firefighters and EMS personnel.

***Cooperative Agreements*:** The District is part of a strong Quad County mutual aid agreement that has developed a dispatch matrix that allows us to put a large amount of resources on an incident in a very short period of time. This has proven to be very successful; we are able to control potentially large incidents from getting out of control and additionally reduce the need to call for State Mobilization Assistance. In addition to the Quad County mutual aid agreement, the District also has mutual aid agreements with; WA DNR, ODF, and the USFS. The District also participates in a County Strike Team that responds as an initial attack team to our neighboring counties, and in the Statewide Fire Mobilization Plan.

District Needs/Wish List

***Wildland Urban Interface Defensible Space*:** The fire District has a current contract with the Department of Corrections to utilize their work crew to create defensible space around structures in the WUI areas. This program has been very successful since the Blue Creek Fire. We wish to continue to use this program and maximize the use of our staff time to meet with property

owners and educate them on the value of defensible space. Funding for staff time is a need of the fire District to enhance this program and complete structural assessments every five years.

***Fire Breaks*:** Changes in the CRP rules that would allow fire breaks down to the dirt without a negative financial impact to the property owner would be beneficial.

***Rural Water Supplies*:** Continue to seek and develop water supply systems in our rural areas for assistance in fire suppression.

***Residential and Agricultural Burning*:** All open burning within Walla Walla County, is subject to guidelines concerning, size, time, location and permit requirements. County Residents can find the guidelines for non-agricultural open fires by referring to: http://www.co.walla-walla.wa.us/departments/comdev/BurnControlFormsandPublications.shtml
Agricultural burning in Walla Walla County is regulated by the State Department of Ecology. These burns are subject to specific requirements and are limited by air quality management, weather and hazardous fire conditions. For Specific information on the permitting process, fees and restrictions regarding Agricultural burning in Walla Walla County please refer to http://www.ecy.wa.gov/programs/air/aginfo/agburnpermitpage.htm

***Others*:** As with most volunteer agencies, the District continues to seek ways to improve its ability to recruit and retain good firefighters and EMS personnel.

Table 2 Inventory of Equipment for Fire District #4 Walla Walla County

Walla Wall County Fire District #4				**2016 Apparatus Inventory**			
2251 South Howard St., Walla Walla, WA 99362							
Fed ID #91-1520091							
Unit #	**Year**	**Make**	**Tank Size**	**Type**	**GPM**	**Other Information**	**Available for Mob.**
Station #41 (2251 S. Howard)							
UT341	2015	Chevrolet Tahoe				Command	Yes
UT342	2009	Chevrolet Tahoe				Command	Yes
UT343	2012	Ford F250				Command	
UT346	1992	Ford Ranger					
UT347	1975	Chevrolet 1 Ton					
E3411	2015	Rosenbauer	1000	Type 1 Engine	1500	Structure w/ Foam	Yes
E3416	1999	Freightliner	1000	Type 1 Engine	1500	Structure w/ Foam	Yes
E3451	2001	Ford	425	Type 5 Engine	700	Brush w/ Foam	
E3456	2001	Ford	425	Type 5 Engine	700	Brush w/ Foam	Yes
Water Tender 3431	2006	Chevrolet	2000	Type 3 Tender	500	Tender w/ Pump	Yes
A3421	2016	Dodge		Ambulance			

Rescue 3441	2003	Ford		Ambulance			
Cribbing 341	2009	Roseburg		Cribbing Trailer			
Transport 341	1998	Freightliner		Dozer Transport			
Dozer 3421	2016	John Deere 700K		Dozer		Tractor/Bulldozer	Limited
Dozer 3426	1980	Case		Dozer		Tractor/Bulldozer	Limited
Dozer Trailer	1971	Hyster Lowboy		Dozer Trailer			
Station #42 (675 Wallula Rd)							
E3412	2006	International	1000	Type 1 Engine	1500	Structure w/ Foam	Yes
E3452	2009	Ford	400	Type 5 Engine	500	Brush w/ Foam	
Water Tender 3422	2009	International	2500	Type 2 Engine	500	Tender w/ Pump	Yes
Station #43 (1945 E Alder)							
E3413	1999	Freightliner	1000	Type 1 Engine	1500	Structure w/ Foam	
E3453	2003	Ford	425	Type 5 Engine	700	Brush w/ Foam	
Water Tender 3423	2009	International	2500	Type 2 Engine	500	Tender w/ Pump	Yes
Water Tender 3433	1997	Chevrolet	2000	Type 3 Engine	350	Tender w/ Pump	
Station #44 (2327 Old Milton Hwy)							
E3414	1997	Freightliner	1000	Type 1 Engine	1500	Structure w/ Foam	
E3454	2009	Ford	400	Type 5 Engine	500	Brush w/ Foam	
Station #45 (6549 Mill Creek Rd)							
UT345	1993	Ford F450	750	Type 1 Engine		ATV Transport	
E3415	2013	International	425	Type 5 Engine	1250	Structure w/ Foam	
E3455	2003	Ford	2000	Type 3 Engine	700	Brush w/ Foam	
Water Tender 3435	1997	Chevrolet	90		350	Tender w/ Pump	
ATV345	2008	Polaris 6x6			100	ATV	Yes

Walla Walla County Fire District #5

***District Summary*:** Walla Walla County Fire District #5 protects an area of approximately 92 square miles next to the confluence of the Snake and Columbia River systems, serving a population of about 4,088 residents. The District serves the communities of Burbank, Burbank Heights, Sun Harbor, and Wallula. Located within our District are suburban and rural populated residential areas, commercial and industrial complexes that includes an Army Corps of Engineers Dam (Ice Harbor Dam), educational facilities, as well as agricultural and wildland areas. To provide timely service to this diverse area, we currently have four fire stations strategically located to provide the best protection to all.

The communities of Burbank and Burbank Heights are essentially bisected by the McNary National Wildlife Refuge and Recreation Area that covers approximately 5,000 acres. We have two type 1 engines, one ladder truck, four type 5 engines, two type 2 water tenders, one type 4 rescue unit, two ALS ambulances, and three command vehicles. We are a combination fire

department with 4 career staff and 30 dedicated volunteer firefighters, officers, EMT's, First Responders, and support personnel. Our entire operation utilizes approximately 34 people.

The District average's 500 calls for service per year and 60 percent of those calls are for EMS service and 40 percent for fire. The District's area has some small areas that are considered wildland urban interface areas with permanent homes in these areas. The district works closely with Fish & Wildlife Fire crews during the fire season to protect the Wildlife Refuge and surrounding areas and those homes that are next to the Refuge area.

Issues of Concern:

Wildland Urban Interface and Residential Growth: The fire district has several permanent homes in the wildland areas and each year more home are being built in the WUI area. Defensible space and fire adapted communities is extremely important for these homes and the safety of the residents and our firefighters. However, at times, it is challenging to motivate home and property owners to take the initiative to make their home better prepared to withstand a wildland fire.

There is a concern with residential properties along the Monument Drive road with homes being developed with limited or no defensible space. Many of these homes have several acres of brush, grass and sage directly contacting their homes without any fire breaks.

Communications: The District is part of a Franklin County Dispatch center (Franklin County 911) that is responsible for dispatching all fire/ems calls for the District. Although our fire district is located in Walla Walla County, we are dispatched thru Franklin County 911. 98% of our Mutual and Auto Aid calls for assistance are from Franklin County agencies including Pasco Fire Department and Franklin County Fire District#3 due to their geographic proximity to Burbank and Burbank Heights, the District's most heavily populated areas.

Residential and Agricultural Burning: All open burning, other than some special situations such as small areas of fence rows or irrigation ditches require a 'Burn Permit' and are allowed only on designated 'Burn Days". Agricultural open field burning is permitted and regulated by the State Department of Ecology. At times, the allowed residential burn day has been authorized when

conditions are present for large fire growth. A better system for determining a burn day needs to be created.

Other: As with most volunteer agencies, The District continues to seek ways to improve its ability to recruit and retain good firefighters and EMS personnel.

***Cooperative Agreements*:** The District is part of a strong Quad County mutual aid agreement (Benton, Franklin, Walla Walla, Columbia) that has developed a dispatch matrix that allows us to put a large amount of resources on an incident in a very short period of time. This has proven to be very successful; we are able to gain control of incidents which have the potential to become large and reducing the need to call for State Mobilization assistance. The District also has mutual aid agreements with; the WA DNR, and US Fish & Wildlife. The District also participates in a County Strike Team that responds as an *initia*l attack team to our neighboring counties. We also participate in the Statewide Fire Mobilization Plan.

District Needs:

Wildland Urban Interface Defensible Space: The fire district has been utilizing Wildland Defensible Space pamphlets and mailers to educate homeowners about defensible space around structures in the WUI areas. It should be noted that among some private property owners this program has had little success. We wish to continue to maintain this program by using staff time to meet with property owners and educate them on the value of defensible space. Funding for staff time is a need of the fire district to enhance this program and complete structural assessments every three to five years.

Fire Breaks: Possible changes in the CRP rules which would allow fire breaks down to the dirt without a negative financial impact to the property owner.

Rural Water Supplies: Continue to look for and develop water supply systems in our rural areas. Whether that is for natural cover fire or residential fires.

Residential and Agricultural Burning: Educate the public and the agricultural producers of the requirements to legally and safely conduct all open and field burns.

Other: As with most volunteer agencies, The District continues to seek ways to improve its ability to recruit and retain good firefighters and EMS personnel.

Walla Walla County Fire District #6

***District Summary*:** Walla Walla County Fire District #6 is located in the SW portion of Walla Walla County and services 220 square miles. The area consists mostly of dryland farming, CRP, rangeland and some irrigated acres. The District has mutual aid agreements with all the Districts within Walla Walla County, the DNR, and the Federal Fish and Wildland agencies. The Fire District operates under the name of 'Walla Walla County Fire District #6' and is staffed by 30 volunteer members. The District has eight EMT's, eight EMR's, 19 structural certified personnel, 17 Red carded and 26 EVAP certified personnel. The District has two stations; one (S61) located in Touchet and one (S62) located in Lowden. Equipment used by the District can be found in Table 3. The District averages 180 calls for service per year and 40 percent of those calls are for fire. There are many areas within the District that have a high natural cover fuel load and the potential for a substantial wildland fire is high.

Issues of Concern

***Residential Growth*:** With the completion of SR-12 the District feels the Touchet area will continue to grow as a bedroom community for the cities of Walla Walla, College Place and the Tri-Cities. With this continued growth the District expects to see individual and small housing developments continue to increase. This will cause a shift in the demand for EMS from less traffic accidents to an increase in medical responses. And on the fire side a need to triage, mitigate and provide more wildland structure protection during large scale incidents.

***Communications*:** The District is part of a County wide Dispatch center (WESCOM) that is responsible for dispatching all fire (both city and county) and police (both city and county) personnel as well as the City of College Place fire department resources. Within the past year, WESCOM has increased its service to Columbia County Fire Districts 1 & 3 and parts of Umatilla County in Oregon by utilizing a single Computer Aided Dispatch (CAD) system for all parties. WESCOM has a rather sophisticated, intricate, and somewhat temperamental – repeater simulcast micro wave system. Although the system has gone through a major equipment update and fine tuning, the service area due to topography continues to have areas where radio communications between Dispatch and Fire/EMS responders is difficult or impossible.

***Burn permit Regulations*:** All open burning, other than some special situations such as small areas of fence rows or irrigation ditches require a 'Burn Permit' and are allowed only on designated 'Burn Days'. Agricultural open field burning is permitted and regulated by the State Department of Ecology. The establishment of the regulations and the enforcement of the rules are the responsibility of the County and DOE. When the District is dispatched to an unauthorized 'Control Burn' it will provide information to the responsible individual and inform Dispatch of the situation.

Other: As with most all-volunteer agencies, The District continues to seek ways to improve its ability to recruit and retain good firefighters and EMS personnel.

***Cooperative Agreements*:** The District is part of an 'All County' mutual aid agreement that has developed a dispatch matrix that allows us to put a large amount of resources on an incident in a very short period of time. This has proven to be very successful; we are able to control potential large incidents from growing out of control and are reducing the need to call for State Mobilization Assistance. The District has mutual aid agreement with; the DNR, the Federal Fish & Wildlife Service, and bordering counties. Additionally, the District participates in a County Strike Team that responds as an initial attack team to our neighboring counties. Unfortunately, because all our members are volunteers and have day jobs we are unable to participate in the Statewide Fire Mobilization Plan.

District Needs/Wish List

As a rural area, the District continues to look for and develop water supply systems to assist in fire suppression. In the irrigated areas during irrigation season the growers are very accommodating and willing to provide the District with a water source. But during the off season and in the dryland areas water can be a challenge. The District continues to work with the land owners in developing strategic locations for water supply. This is mainly accomplished by spotting portable 10,000 gallon waters tanks during the high demand months that can be filled from an existing well.

The District's short-range plans (next five years) are to replace its type 6 engine with a type 4 engine and to build a new station for vehicle storage in the Lowden area. The District's long-range

goals are to continue to upgrade its equipment and PPE as well as increase its ability to recruit and retain good firefighters.

Table 3 Walla Walla County Fire District #6 Inventory List

Walla Wall County Fire District #6				**2016 Apparatus Inventory**			
656 4th St., Touchet, WA 99360							
Fed ID #03-578157							
Unit #	**Year**	**Make**	**Tank Size**	**Type**	**GPM**	**Other Information**	**Available for Mob.**
Station #61 Touchet							
UT361	2004	Chevrolet Tahoe				Command	
UT362	2000	Ford Explorer				Command	
E3611	1998	Pierce Saber	750	Type 1 Engine	1500	Structure w/ Foam	
E3613	1994	Pierce Dash	750	Type 1 Engine	1500	Structure w/ Foam	Yes
E3661	1997	Chevrolet Cheyenne	310	Type 6 Engine	100	Grass/Foam	
E3652	1996	Chevrolet Cheyenne	400	Type 5 Engine	100	Grass	
E3654	2015	Ford F-550	400	Type 5 Engine	150	Grass/Foam	Yes
W3621	1992	Freightliner M916A1	3000	Type 2 Engine	750	Water Tender	Yes
W3622	1995	GMC Topkick	3000	Type 2 Engine	750	Water Tender	Yes
R3641	2001	Freightliner FL60		Type 4 Tender		Rescue/BLS	
Station #62 Lowden							
E3653	2011	Ford F-550	400	Type 5 Engine	150	Structure w/ Foam	Yes
E3612	1981	Ford C-8000	500	Type 1 Engine	1100	Brush w/ Foam	

Walla Walla County Fire District #7

District Summary: Fire District #7 is a large district with 188 square miles and approximately 192 residents. It contains large areas of CRP with very few natural fire breaks.

Issues of Concern: Every year it has been more difficult to find firefighters who are willing and able to respond to calls. Being an agricultural area, there is a daily influx of seasonal workers that increases the potential for more human caused fires during the summer and fall due to vehicle traffic and equipment.

District Needs: Fire District #7 is in need of updated trucks and more volunteers in rural areas as well as established fire breaks in areas with large tracks of CRP ground.

Walla Walla County Fire District #8

District Summary: Walla Walla County Fire District #8 covers 145 square miles of South East Walla Walla County. The District has two fire stations; one in Dixie, and one just south of the Walla Walla Airport in a leased building. There are approximately 30 volunteer firefighters in the District. A large majority of the District is comprised of dryland farming (primarily wheat). The eastern portion of the District is mixed with heavy timber as well as areas of wildland urban interface along Lewis Peak Road. These structures are both recreational homes as well as permanent residences. There are an estimated 300 homes within the District's coverage area.

Issues of Concern: Being in an area with approximately 18 inches of annual rainfall, all of the vegetation becomes tinder dry throughout July, August, and September. These are typically the months when the District receives the greatest number of calls. Walla Walla County also experiences sporadic lightning storms during these months further adding to the fire threat. The Lewis Peak area has experienced significant growth in the number of structures being built on the grass/timbered ridgetop and ingress and egress are an issue for many of the housing developments here and throughout the District as there is only typically one way in and out of these areas. Water access is limited in many of the rural areas; thus, water tenders are required to shuttle water to supply any firefighting efforts in these locations. As a 100% volunteer department, personnel are limited during the heavy fire season due to vacations, weekends with the family, and their regular employment commitments.

District Needs: A wildland urban interface truck is needed as residential growth continues. The District also needs to build/acquire a fire/EMS station on the west side of the fire District.

Washington Department of Natural Resources

Equipment: Four type-5 engines with 1 engine leader and 3 fire fighters each.

District Summary: The four Blue Mountain Counties are managed as part of the Blue Mountain Unit. This ranges throughout the counties of the southern tier in the State of Washington including Asotin, Garfield, Columbia, and Walla Walla Counties. DNR fire protection consists of 270,000 acres in the four Blue Mountain Counties. Fire resources are spread throughout this area due to normal workloads and traditional fire risk occurrence. In the case of additional needs the DNR has the flexibility to move additional resources into the area. These can be regional

resources as well as outside resources brought in for short periods of time. DNR, Washington Fire Services (WFS) and the United States Forest Service (USFS) work jointly to supply adequate resources for prevention and suppression activities.

Residential Growth: Residential growth affects the firefighting capabilities of the DNR from the standpoint of those who purchase properties outside of fire districts and then assume that we automatically protect them. This is not the case. Unless the DNR is receiving forest fire patrol assessments (FFPA), the DNR does not assist or take fire suppression measures. Over time this action has become more and more scrutinized. DNR only assesses and protects un-improved forest property. We do not protect structures or agricultural property. The DNR has mutual aid agreements with the fire districts to assist them in areas where they have jurisdictional control. DNR will also assist agencies where we have mutual aid agreements if the fire is within a reasonable distance of DNR protected lands.

Communications: Communications for the area are handled through the statewide radio system which does have weak areas in the Blue Mountains. Radio communications are handled through the Blue Mountain Interagency Dispatch center in La Grande, Oregon.

Fire Management: Fire Management, more commonly referred to as fire overhead, assigned to the Blue Mountain Unit comes from the Clarkston or Dayton areas. When required, additional fire overhead can be ordered and supplied from anywhere in the state depending on availability.

Elevated fire risk: When fire danger reaches a certain increased level of risk due to weather conditions and forecasted scenarios, the DNR has the flexibility to move additional resources into specific areas.

Burn Permit Regulations: On lands within the Department of Natural Resources jurisdiction, open and silvicultural burning is strictly managed and is subject to fuel conditions topography and weather. For more information on DNR burning restrictions please refer to: http://www.dnr.wa.gov/OutdoorBurning

Effective Mitigation Strategies: The Community Wildfire Protection Plans (CWPP) process is one of the best forms of mitigation strategies used to educate the communities on risks and assist them in the formulation of goals and objectives suited for their specific area. The DNR can

assist in finding funding sources for mitigation projects that are outlined or to address needs identified in CWPP documents. The DNR is supportive of firewise.org and believes that the FIREWISE principles are very effective education, planning, and mitigation tools and strategies.

Education and Training: Education and training is an ongoing process. The DNR supplies community support through use of education opportunities such as FIREWISE and community level assistance. We are also able to supply one-on-one landowner assistance through Stewardship planning as well as forest practices assistance. Cooperation with local agency offices provides for boarder educational opportunities.

Current Resources: While the DNR maintains four type 5 engines from June 15 –September 15, the resources assigned to the area can change due to predictions of fire behavior and weather conditions. Additional resources can be staged in predetermined areas to assist in the suppression as needed, which can include additional department overhead personnel, crews, engines, dozers and/or aircraft resources.

Future Considerations: The DNR has added 2 permanent fire staff positions and 2 engines in the last 5 years. Staffing has reached a good management level. Future staffing considerations will likely not change much.

Needs: There are areas in Walla Walla County that are not under the protection of a fire district. Many of these areas do not have any form of formal protection through any fire suppression entity. As stated before, the Department's legislated responsibility lies with protection of unimproved forested lands as well as assisting other agencies and local fire districts.
The areas of any county which are not protected are commonly known as "no-man's land". As with all other fire suppression entities DNR seems to be expected to respond to these fires. In most cases, the Department works cooperatively with other fire suppression agencies to keep all fires small, but there is no assurance that any entity will respond to those "no man's land" incidents if there are no threats to protected lands or if the Department is involved in a multiple fire start situation. This creates a situation where there is a need for the local residents to recognize that **they do not have fire protection**. The residents need to look at their options and determine what will work best to provide themselves with adequate fire protection.

Oregon Department of Forestry

District Summary: The Oregon Dept. of Forestry has wildland fire protection responsibilities for private and non-federal public lands in the Eastern part of Umatilla County.
Lands included in this CWPP are limited to the Mill Creek area that lie within the boundary of Oregon. These lands are administered by the Pendleton Unit of the Northeast Oregon District of ODF. The Pendleton Unit protects approximately 575,000 acres in Umatilla, Morrow and Grant Counties in Oregon.

ODF administers a burn permit program requiring landowners to acquire permits only during closed fire season, typically mid-June through mid-September.
Fuels Reduction & Treatment: ODF has secured several grants through the National Fire Plan and other sources for fuels treatment in Umatilla County since the last CWPP was written in 2006. Projects include both fuels reduction on lands and defensible space treatment around structures in the Mill Creek area. Projects are currently active and ongoing at this time and more are expected in future years.

Fire protection resources: ODF staffs five type 6 engines and one type 3 water tender in the Pendleton Unit. Three of the type 6's and the tender are based out of Pendleton, the remaining two type 6 engines are stationed at the Ukiah Guard Station in southern Umatilla County. ODF has access to aircraft through exclusive use contracts. Four aircraft are hosted locally in Northeast Oregon District. Two Single Engine Air Tankers and one recon plane are located in LaGrande and a type 2 restricted helicopter is located in Pendleton during fire season.

United States Forest Service

District Summary: The USDA Forest Service has responsibility for management of National Forest System lands within Walla Walla County. These lands are administered by the Walla

Walla Ranger District which is part of the Umatilla National Forest. Headquarters for the Ranger District is in the City of Walla Walla. The District is approximately 384,000 acres.

Walla Walla Ranger District has initial attack responsibility for Forest Service lands within Walla Walla County. The District's suppression organization is as follows: One Fire Management Officer, two Assistant Fire Management Officers, three type-6 engines (3-4 personnel), one hand crew (10 personnel), one watershed patrolman and three staffed lookouts. During fire season, when available, the fire management officer on duty has other regional and national ground and aerial resources to consider.

These resources could include both aerially delivered, engine and hand crews. Aviation resources could include air tankers and helicopters of varying types to support ground resources. The District utilizes a contracted fixed wing single engine detection plane through the fire season, this asset is used on a case by case basis, depending on fire conditions and lightning events.

Community: Communities in Eastern Washington experience the impacts of wildfire on an annual basis. Its citizens are directly affected by the smoke, vegetation loss, and the loss of property, followed by the secondary occurrences of erosion, loss of biodiversity, and economic loss. In 2015 there were a total of 364 structures lost due to wildfires, the Okanogan Complex claiming 195 buildings and caused three casualties. Walla Walla County is no stranger to wildfire on the landscape having three wildfires over 6,000 acres since 2005. The Eureka Fire (2010) and Walker Canyon Fire (2005) both exceeded 20,000 acres. Currently a partnership with the Department of Corrections work crew and funded through a Pre-disaster Mitigation Grant program, has enabled the residents of Walla Walla County access to an inexpensive method for building a defensible space around structures. To date, 80 residences have utilized the grant and work crew to build defensible spaces around their homes. Most of the participants are located within the foothills of the Blue Mountains, with markedly less owners taking advantage in the areas of agricultural and CRP lands.

Summary

Fire District Preparedness Volunteer Firefighter Recruitment

The rural fire departments in Walla Walla County are predominantly dependent on volunteer firefighters. The trend for several years, in many volunteer fire departments, is that membership

has continued to decrease. This can be attributed to several reasons including the need for two wage earners in a household to support their family, lack of desire from today's generation, and the tremendous amount of time spent in training to satisfy the ever-increasing regulations from state and federal agencies. Whether it be job and family commitments combined with hobbies or competition with other volunteer organizations, it comes down to the fact there is very little time left for being a volunteer firefighter. This is exacerbated by the added stress of emergencies and inherent dangers of the job, further complicated by society's general lack of support and/or appreciation for the commitment and sacrifices made by volunteer firefighters.

Today's fire departments, career and volunteer, find themselves in a position where there is an increasing demand for their services, increasing operational costs and overall limited available resources. In the rural setting this can significantly increase risk as available resources are stretched to maintain coverage of large areas. In particular, many departments have difficulty maintaining volunteers available during regular work day hours (8am to 5pm).

Conservation Reserve Program

Since the introduction of the CRP by the federal government, many formerly crop producing fields have been allowed to return to native grasses. CRP fields are creating a new fire concern throughout the west as thick grasses are allowed to grow year after year leading to the buildup of dense mats of fine fire fuels. These conditions lead to a continuous fuel bed allowing fires in CRP fields to burn with greater intensities and long flame lengths that can often spread across roads or other fire barriers, particularly under the influence of wind. Many landowners and fire personnel are researching allowable management techniques to deal with this increasing problem.

Communication

There are several communication issues needing to be addressed within Walla Walla County. Due to the diverse topography, many of the emergency responders have identified areas of poor reception for both radios and cell phones. The lack of communication between responders as well as the limitations of the central dispatch significantly impairs responders' ability to effectively and efficiently do their job and additionally poses a greater risk to their safety.

Public Wildfire Awareness

As the potential fire risk in the wildland-urban interface continues to increase, it is clear that fire service organizations cannot be solely responsible for protection of lives, structures, infrastructure, ecosystems, and all of the intrinsic values that go along with living in rural areas. Public awareness of the wildland fire risks as well as homeowner accountability for the risk on their own property is paramount to the protection of all the resources in the wildland-urban interface and the Mill Creek Watershed.

FIREWISE Communities Program encourages local solutions for safety by involving homeowners in taking individual responsibility for preparing their homes from the risk of wildfire

Fire Adapted Communities incorporates people, buildings, business, infrastructure, cultural resources and natural areas into the effort to prepare for the effects of wildland fire.

Wildfire Community Preparedness Day is an excellent opportunity for neighborhoods and fire agencies to work together to make communities a safer place to live. Efforts raise wildfire awareness and help protect homes, neighborhoods, and entire communities, while increasing safety of wildland firefighter or could lessen current post-fire impacts.

The national **Ready Set Go! Program**, managed by the International Association of Fire Chiefs (IAFC), works to develop and improve dialogue about wildland fire awareness and action between local fire departments and the residents they serve. It is designed to be complimentary and collaborative with FIREWISE and other wildland fire public education efforts.

NFPA Fire Prevention Week offers information and tools to help public educators teach all audiences about important fire and life safety issues.

FEMA's America's PrepareAthon! Is an opportunity for individuals, organizations, and communities to prepare for specific hazards, including wildfire, through drills, group discussions, and exercises.

The continued development of mechanisms and partnerships to increase public awareness regarding wildfire risks and promoting "do it yourself" mitigation actions is a primary goal of the CWPP steering committee as well as many of the individual organizations participating on the committee.

Chapter 4

Walla Walla County Characteristics

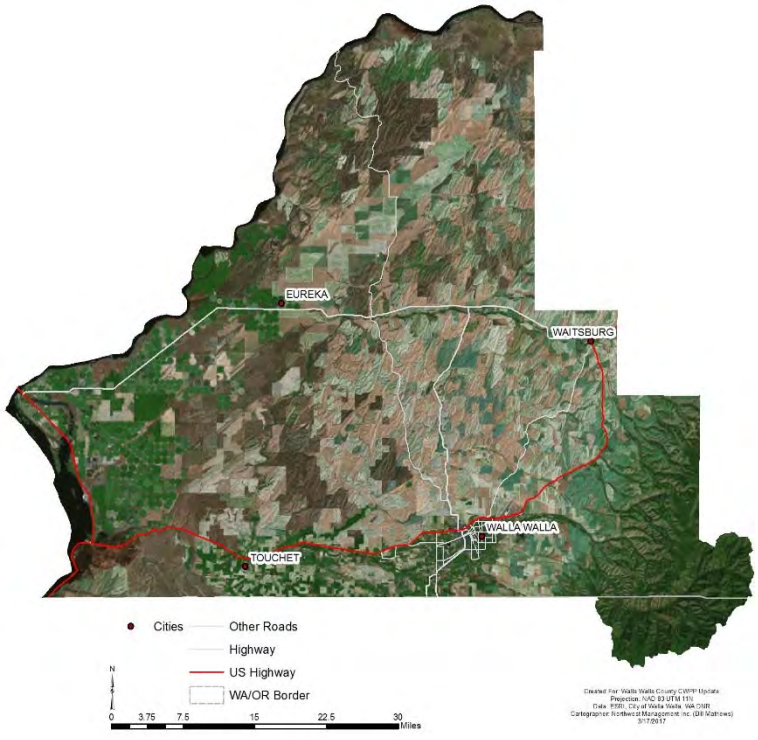


Figure 3 Aerial Map of Walla Wall County and Mill Creek Watershed

Walla Walla County is located on the Columbia Plateau and has been included as part of the Palouse ecoregion, which has loess covered basalt plains, modified by glacial action and scoured by repeated floods during the Miocene and Pliocene eras. This includes features such as plateaus, buttes, and channels. Channels are made up of outwash terraces, bars loess islands and basins. The plateaus contain circular mounds of loess (biscuits) surrounded by cobble- size fragments of basalt. Soils generally consist of Palouse loess with varying amounts of rock or gravel, and basaltic rock outcroppings. Generally, the soils along on the Southeastern most portion of the County are derived from the local parent material, which includes granite and basalt. Located on the western edge of the Blue Mountains, the highest peak in Walla Walla County is Lewis Peak at 4,888 ft. above sea level. The lowest point in the County lies along the Columbia River at 340 ft. elevation.[6]

Table 4 Ownership by Acreage and Percentage

Land Owner	Acreage	Percent
Private	1,249,949	89%
US Forest Service	101,197	7%
State	20,607	2%
Water	2,317	<1%
Bureau of Land Management	3547	<1%
U.S. Fish and Wildlife Service	610	<1%

Land Use

The predominant land use in Walla Walla County is agriculture, in the form of dryland and irrigated fruits, berries, grain crops, CRP and livestock grazing. As of 2012 Walla Walla County had 943 farms covering 645,121 acres which

[6] Carson et al. 2008, Where the Great River Bends

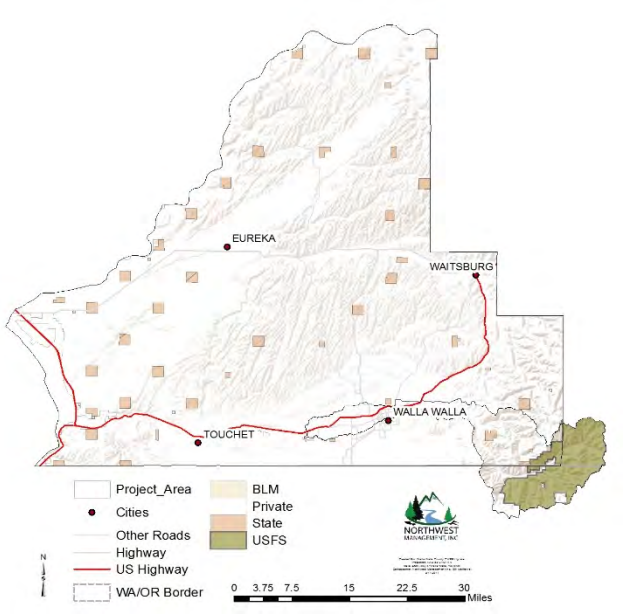


Figure 4 Ownership map for Walla Walla County and the Mill Creek Watershed

represented 82% of the total land area in the county. The average farm size is 734 acres[7]. Irrigated agricultural practices occur on approximately 92,438 acres while dryland agriculture occurs on the remaining approximately 550,000 acres. The 2012 Agriculture Census ranked Walla Walla County as fifth in Washington State for volume of agriculture sales, with a total of $344.5 million in 2012 and an average of total of $361,772 in annual sales per farm. Recently there has been an increase of vineyards in the area leading to increased tourism. The largest urban population is the County seat, City of Walla Walla with roughly 32,000 people or 54% of the total County population. Walla Walla is also the home of two higher education establishments, Whitman College and Walla Walla Community College.

Climate

According to the Koppen-Geiger classification system Walla Walla Washington is a hot Mediterranean, dry-summer climate. The average monthly temperature varies from a low of 34 degrees Fahrenheit to a high of 75 degrees in July, averaging 53 degrees. There is an average of 205 frost-free days in the growing season with annual precipitation averaging 20 inches.[4] Rainfall in Walla Walla County averages around 16.5 inches a year, with an additional 12 inches of snowfall a year on average, and 107 days of precipitation.

Population and Demographics

The 2010 Census established the Walla Walla County population at 58,781, which shows an increase from a population of 55,180 in 2000. There are four incorporated cities within Walla Walla

[7] U.S. Department of Agriculture's National Statistics Service 2012 Census of Agriculture: Washington State and County Data. Available online at: http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/Washington/wav1.pdf. Accessed January 2017.

City	Population	Percentage
Walla Walla	31,731	54 %
College Place	8,765	15 %
Burbank	3,291	5 %
Waitsburg	1,217	2 %
Touchet	421	<1 %
Prescott	318	<1 %
Dixie	197	<1 %
Wallula	179	<1 %

County, and since 1890, the population of Walla Walla County has been steadily increasing with the only decrease in population occurring between 1910 and 1920. The U.S. Census Bureau estimates that Walla Walla County has only experienced a 2.6% increase in population since 2000 compared to a 6.6% increase statewide. Walla Walla County's increase in population is largely within the urban areas, such as the City of Walla Walla, and other outlying communities, with minor changes in the amount of wildland urban interface. The Census Bureau also reported that there were 257 private nonfarm establishments and 4,457 households. The median income for a household in Walla Walla County is $47,946, which is less than the statewide median of $61,062.[8]

Fire History

To protect the water quality, Mill Creek Watershed has long been managed to suppress the natural fire regime, or the frequency at which fire returned to the landscape and the severity of fire on vegetation. The Fire Regime Condition Class (FRCC), a dataset measuring the departure from historic natural fire regime, classifies the Mill Creek Watershed at 60% Condition Class 2 or moderate departure from normal and 10% as Condition Class 3, or high departure. Fire behavior and effects for Condition Class 3 can result in a loss of key ecosystem components. In 2015 the Mill Creek Watershed was threatened by the Blue Creek Fire that started on

Figure 5 Blue Creek Fire, Image from InciWeb.nwcg.gov

[8] U.S. Census Bureau. State & Quick Facts: http://quickfacts.census.gov/qfd/states/53/53043.html. Accessed January 2017.

July 20th, northwest of the Mill Creek Watershed, and burned up to its western boundary about 10 miles east of Walla Walla. Due to excessively dry conditions and high temperatures during the 2015 summer, the fire had been ignited by harvest equipment during a wheat harvest. The Blue Creek Fire encompassed 5,992 acres before it was contained and was estimated to cost more than $10 million in suppression funding alone. Other recent large fires in the region include; School – 2005, Columbia Complex – 2006, Eureka – 2010, Monumental – 2014, Grizzly Bear Complex – 2015, and Tucannon – 2015.

On August 5th of 2005 the School Fire started when a dead tree fell into a powerline and ignited the dry grass below. The following day the fire had grown to 30,000 acres due to dry and windy conditions and ultimately burned more than 50,000 acres before being contained, making it the largest in the lower 48 states that year. The direct cost of the School Fire reached $9 million, which included suppression efforts and damage estimates to over 100 residences.

Figure 6 Post fire image of a high severity fire in the area, photo from NIFC.gov website

The following year, lightning started the Columbia Complex which burned northeast of the City of Walla Walla and consumed 132,048 acres of predominantly forested land. The suppression cost for this fire was over $35 million. With an unknown loss in timber value and six structures destroyed the true cost of the Columbia Complex has been estimated well in excess of the initial $35 million.

The Grizzly Bear Complex in 2015 was a combination of 18 lightning starts, and burned 83,418 acres east of Mill Creek Watershed. Similar to the Columbia Complex, the Grizzly Bear Complex burned largely forested lands in the Umatilla National Forest and in the Wenaha – Tucannon Wilderness areas with a suppression cost of $22.4 million.

The Mill Creek Watershed

Covering roughly 36 square miles of the Blue Mountains the Mill Creek Watershed is situated in Southeastern Washington and Northeastern Oregon. The headwaters of Mill Creek begin in Umatilla and Wallowa counties in Oregon before traveling through Columbia and Walla Walla counties in Washington. The watershed has been designated as a Roadless area by the US Forest

Service and has remained a protected watershed since 1918. The management of the watershed exemplifies the multijurisdictional management of lands and fuels for fire management that is laid out in the National Cohesive Wildland Fire Management Strategy (CWS). While outside their jurisdictional bounds both Fire District #4 and #8 provide fire suppression support in the area with aid from the WA DNR and the U.S. Forest Service. The watershed provides an important ecosystem service to the City of Walla Walla and the neighboring communities as the primary municipal water source. The quality of Mill Creek water is such that it is used unfiltered. To maintain this unfiltered water source for a community there are strict regulations set by the State to provide for safe drinking water. Some of the key criteria are listed below.

- Turbidity of less than 5.0 NTU (Nephelometric Turbidity Units).
- Fecal coliform density less than 20/100mL in 90% of samples.
- Virus and Giardia inactivation met 11 months out of 12.
- Distribution system disinfection residual maintained.
- Municipal Watershed control program implemented.
- System meets Total Coliform Rule.
- System meets Stage 1 DBP (Disinfection Byproduct) Rule.

Over 300 homes lay along Mill Creek Road which is the primary access road within the watershed. Additionally, the municipal water intake facility for the City of Walla Walla is positioned at the end of road approximately 16 miles from the Walla Walla City limits. The intake facility is managed and maintained by a City employee that resides on site. In addition to facility management and maintenance the employee patrols the watershed to enforce the no trespassing ordinance.

There are several homes in the area that have taken advantage of a grant that provided funding for defensible space creation around structures. The City of Walla Walla partnered with Oregon Department of Forestry to create a 200-foot defensible space around all City owned structures at the intake site. Washington DNR has plans to construct a 10 mile long, 200 foot wide shaded fuel breaks along portions of the Western edge of the watershed. Previous efforts by the Forest Service have also increased access to the area along Forest Roads 64 and 65 to the west, south, and eastern of the watershed.

Access to the watershed is granted by permit only and restricted to official business and a handful of big game hunters in the fall. The City of Walla Walla has provided funding for a Forest Service employee to patrol the perimeter of the watershed and one employee to occupy the Mill Creek intake facility.

Summary

Fire history in and around the Mill Creek Watershed and Walla Walla County has shown that the area experiences frequent fires. Therefore, given the current fuel load levels, coupled with hotter and drier summer conditions and an extended fire season, these fires can be expected to increase in size, frequency and severity as compared to those experienced in the past. Wildfire suppression has been successful to date in containing wildfires that threaten the Mill Creek Watershed, but without proper mitigation efforts that trend will not be sustainable. A wildfire within the watershed boundary may force the City of Walla Walla to rely on water from wells until the Mill Creek water quality recovers to Federal and State drinking water standards. This could take years or even decades depending on fire impact. A wildfire within the boundaries of the Mill Creek Watershed is inevitable as was demonstrated by the Blue Creek Fire in 2015. While the Blue Creek Fire did not affect the water quality of the Mill Creek Watershed, it did heighten the awareness of the public to increase fire mitigation efforts in and around the watershed. Any fire within Mill Creek that alters the water quality enough to require filtration would place severe economic strain on the City of Walla Walla in its responsibility to provide drinking water to its citizens.

Chapter 5

Community Outreach and Participation

Introduction

Approximately 90% of the land in Walla Walla County is in private ownership. Walla Walla County is roughly 90% private lands and the remaining 10% divided up between multiple State and Federal agencies. With respect to the 90% of private landowners, who are largely farmers that work the land and are therefore very familiar with the state of vegetation across the County, public outreach was viewed as a vital part of the planning process. While public involvement is required in the planning process, (44 CFR, Section 201.6(b)(1)), the planning committee recognized the value and benefit of collaboration with the public and encouraged involvement in the planning process of the CWPP document. Multiple methods of public involvement and awareness were implemented through the planning process, with public meetings provided across the County and CWPP committee presence at the local fire related presentation "Era of Megafires". Advertisement for public outreach events was accomplished through the use of multiple media formats including: Emergency Management Department's website and Facebook page, email distributions, and flyers at local businesses and colleges.

Public outreach meetings were designed to incorporate a diversity of points of view on the planning process, mitigation projects, community needs, and risk assessment. Planning committee members were present and meetings were facilitated by Northwest Management Inc.

Public Participation

The meetings were conducted to provide those present with updates, new information and to obtain feedback from attendees. A holistic approach toward community fire protection through partnership was the desired outcome. Using the new National Cohesive Wildfire Strategy, the committee incorporated its three key goals as the foundation in achieving a synergistic, planned approach in the new CWPP.

The focus of the meetings was to share information about current CWPP committee activities regarding plan development, current County fire risks, ongoing collaborative efforts, fire organization and landowner responsibilities, and ways to get involved in the process. Meetings

were also designed to build new and improve existing partnerships with the community. Through the meetings, we provided tools, methods, and opportunities for playing an active role in risk reduction measures. Emphasis was put on using community input to help develop portions of the CWPP and design a plan that encouraged landowner involvement in wildfire risk reduction.

Era of Megafires Presentation

Dr. Paul Hessburg presented a talk on the current state of wildfires, looking at management activities, climate change, public perception, and what needs to happen to create resilient forests and communities. The planning committee attended the event with a booth set up with information about the update of the previous Mill Creek Watershed CWPP to a County-wide CWPP, along with information on creating defensible spaces and creating firewise communities. The event was facilitated and housed at Whitman College, and was well attended by the local community. Citizen concerns regarding the Mill Creek Watershed were evident during the post presentation questions and answers.

Figure 7 Era of Megafires Presentation Flyer

Public meetings were scheduled in strategic locations during the wildfire risk assessment phase of the planning process to share information on the Plan, obtain input on the details of the wildfire risk assessments, and discuss potential mitigation treatments. Attendees at the public meetings were asked to give their impressions of the accuracy of the information generated and provide their opinions of potential treatments.

Outreach

Several avenues were used to incorporate local communities into the CWPP process. Media outlets, such as Facebook and local web sites, were used to reach out to the public. These were found to be the best source in linking local citizens to the CWPP process. Use of the Emergency Management Department's Facebook page provided the ability to see the number of times the information was shared and an avenue for directly responding to questions.

News Releases

Under the direction of the steering committee, periodic press releases were submitted to the various print and online news outlets that serve Walla Walla County. Informative flyers were also distributed around town and to local offices within the communities by the committee members. Additional methods in reaching out to citizens and cooperators included newspaper articles, postal service mailed letters sent out to cooperators, and email messages. Included in outreach materials and announcements were: intent of meetings and dates, opportunities to be locally involved, and local contacts for more information.

Public Meetings

Public meetings were scheduled in strategic locations during the wildfire risk assessment phase of the planning process to share information on the Plan, obtain input on the details of the wildfire risk assessments, and discuss potential mitigation treatments. Attendees at the public meetings were asked to give their impressions of the accuracy of the information generated and provide their opinions of potential treatments. The public meeting announcement was sent to the local newspapers and committee members were asked to post the flyer shown in around their communities.

Figure 8 Public Meeting Flyer

The schedule of public presentation meetings in Walla Walla County included three locations: Mill Creek, Walla Walla, and Touchet, Washington, to provide adequate opportunity for members of every community to attend without considerable travel. The Mill Creek public meeting was attended by four individuals on the committee and thirteen from the general public. Fire start and fire history information and how it was included within the plan was of concern from multiple citizens. The need to differentiate lightning starts from human caused starts was addressed to accurately

assess the risk to the watershed. The information on fire starts, while not presented within the maps, is provided within the GIS data and used during the final risk assessment. In addition to the fire start concern, there was a question about the information behind the structure locations around the Mill Creek Watershed. Address locations were provided by the County and the gaps within the data may detail an expansion within the WUI that needs to be addressed.

The Walla Walla meeting was held at County District Fire Station #4 and was well attended with thirteen residents and five of the committee members. Discussion around plan development was minimal with no input from the public to any portion of the plan or assessments. The Touchet meeting was attended by three committee members and eight residents. Multiple projects and issues were proposed by the citizens, which will be included within Chapter 8, and include:

- Roadside spraying of vegetation along highways and increased accessibility along Blacksnake Ridge Road.

- Education about funding sources and other resources available to homeowners to better protect homes from wildfire.

- Fires starting on unprotected private lands in Oregon have posed significant risk to communities in Washington. The Oregon citizens refuse protection from Oregon and Washington Fire Districts, which leads to fires growing past a manageable state as they enter Washington, placing stresses on the local districts staff and resources. Currently no solution is evident.

- Suggestion of increased communication between Walla Walla County Washington and Umatilla County Oregon were proposed as attempts are made to find a solution.

The Planning Team

City of Walla Walla, Oregon Department of Forestry, and Walla Walla County Emergency Management provided funding for the creation of this plan. Emergency Management facilitated the Community Wildfire Protection Plan meetings. Stakeholders involved in the meetings included representatives from local communities, Walla Walla County Conservation District, Oregon Department of Forestry, Fire Protection Districts, federal and state agencies, and local organizations with an interest in the County's fire safety.

The planning philosophy employed in this project included the open and free sharing of information with interested parties. Information from federal, state, and local agencies was

integrated into the project knowledge database. Meetings with the committee were held throughout the planning process to facilitate a sharing of information between participants. When the public meetings were held, many of the committee members were in attendance and shared their support and experiences and their interpretations of the results.

Steering Committee Meetings

The following people participated in steering committee meetings, volunteered time, or responded to elements of the Walla Walla County Community Wildfire Protection Plan's preparation.

NAME **ORGANIZATION**

- Liz Jessee .....Walla Walla County, Emergency Management
- Mori Struve .....City of Walla Walla, Public Works
- Matt Hoehna .....Oregon Department of Forestry
- Devin Parvinen .....Washington DNR
- Spencer Slyfield.....Washington DNR
- Rocky Eastman .....Walla Walla County Fire District #4
- David Winter .....College Place Fire Department
- Larry Hector .....Walla Walla County Fire District #6
- Bob Carson .....Whitman College
- Bob Yancey.....Walla Walla Fire Department
- Patrick Purcell .....Walla Walla County Emergency Management
- Matt James.....U.S. Forest Service
- Joseph Sciarrino .....U.S. Forest Service – Umatilla National Forest
- Judith Johnson .....Kooskooskie Commons
- Renee Hadley .....Walla Walla County Conservation District
- Brad Tucker .....Northwest Management, Inc.
- Bill Mathews .....Northwest Management, Inc.
- Mark Corrao .....Northwest Management, Inc.

Multi-Jurisdictional Participation

44 CFR §201.6(a)(3) calls for multi-jurisdictional planning in the development of Hazard Mitigation Plans which impact multiple jurisdictions. In addition to the participation of federal agencies and other organizations, the following local jurisdictions were actively involved in the development of this Community Wildfire Protection Plan:

- City of Walla Walla
- Washington DNR
- Oregon Department of Forestry
- Walla Walla County Fire District
- U.S. Forest Service
- Natural Resources Conservation Service
- Walla Walla Emergency Management

These jurisdictions were represented on the steering committee and in public meetings either directly or through their servicing fire department or district. They participated in the development of hazard profiles, risk assessments, and mitigation measures. The steering committee meetings were the primary venue for authenticating the planning record.

Committee Meeting Minutes

Committee meetings were scheduled and held from December, 2016 through June, 2017. These meetings served to facilitate the sharing of information and to lay the groundwork for the Walla Walla County & Mill Creek CWPP. Northwest Management, Inc. as well as other planning committee leadership attended the meetings to provide the group with regular updates on the progress of the document and gather any additional information needed to complete the Plan. Steering committee meeting minutes are included in Appendix 2.

Documented Review Process

The opportunity to review and comment on this plan has been provided through several avenues for the committee members as well as the members of the general public. During regularly scheduled committee meetings in the winter and spring of 2016-2017, the committee met to discuss findings, review mapping and analysis, and provide written comments on draft sections of the document. During the public meetings, attendees observed map analyses and photographic collections, discussed general findings from the community assessments, and made recommendations on potential project areas. The first draft of the document was prepared after the public meetings and presented to the committee in May 2017 for a full committee review.

Public Comment Period

A public comment period was conducted from May 19th to June 9nd of 2017 to allow members of the general public an opportunity to view the full draft plan and submit comments and any other input to the committee for consideration. A press release was submitted to the local newspapers on May 19th announcing the comment period, the locations of the Plan for review, and instructions on how to submit comments. An electronic version of the plan was made available online at http://www.consulting-foresters.com/?id=clients.

Continued Public Involvement

The City and County of Walla Walla are dedicated to involving the public directly in review and updates of the Community Wildfire Protection Plan and Wildfire Risk Assessment. The planning committee, working with the Emergency Management, will be responsible for review and update of the plan as recommended by the governing documents.

The public will have the opportunity to provide feedback annually on the anniversary of the adoption of this plan, at an open meeting of the steering committee. Copies of the Walla Walla County Wildfire Protection Plan will be catalogued and kept at Emergency Management's and the City of Walla Walla's websites. A public meeting will also be held as part of each annual evaluation or when deemed necessary by the steering committee. The meetings will provide the public a forum for which they can express its concerns, opinions, or ideas about the Plan. The County Department of Emergency Management will be responsible for using County resources to publicize the annual public meetings and maintain public involvement through the webpage and various print and online media outlets.

Programs

Current work to build defensible space around residences within Walla Walla County is supported by Pre-Hazard Mitigation Grant from FEMA and utilizes a Department of Corrections work program to provide inexpensive labor for individual landowners. To date a total of 80 residence have taken part in the grant with many them along the Mill Creek road.

FIREWISE Communities Program encourages local solutions for safety by involving homeowners in taking individual responsibility for preparing their homes from the risk of wildfire

The national **Ready Set Go! Program**, managed by the International Association of Fire Chiefs (IAFC), works to develop and improve dialogue about wildland fire awareness and action between local fire departments and the residents they serve. It is designed to be complimentary and collaborative with FIREWISE and other wildland fire public education efforts.

Summary

Several attempts were made to reach out and obtain local public involvement. The highest response came from the local residents in the Mill Creek drainage meeting and the City of Walla Walla meeting. They provided valuable information both general and specific to meeting the needs of the CWS goals. Consideration of how to use other educational opportunities within communities may prove valuable. This could provide interaction from both fire response managers and local community members in a joint effort to meet the CWS goals. All stakeholders must be responsible for supporting communication, informing, and joining in the formal and informal communication networks across organizations (CWS 2014).

Chapter 6

Wildfire Risk Assessments

Introduction

Essential to the success of this plan is to improve efforts to work on a landscape-level and better employ science and technology to target areas of high priority for preventing, suppressing, and restoring fire-impacted landscapes using a risk-based approach. A landscape-scale approach to management is one that emphasizes sustainability of entire ecosystems, integrates stakeholder collaboration, and addresses the present and possible future conditions of lands across ownerships. Through application of the "All Hands, All Lands" management, increased collaboration among Federal, State, Tribal, and local officials, natural resources managers, and the fire community can improve the efficiency and effectiveness of the overall fire management effort. The increasing frequency and intensity of wildland fires and the accumulation of fuels throughout ecosystems including invasive annual grasses poses a major threat to ranchers, local communities, and others who live and work in and depend on these lands and resources to sustain their livelihoods and quality of life.

The mild climate, abundance of solar irradiance and low annual and timing of precipitation results in an environment that is potentially very prone to wildland fire. Although much of the native grasslands have been converted for agricultural purposes, there are many areas of native vegetation and fallow farm land that cures early in the summer and remains combustible until winter. If ignited, these areas burn rapidly, potentially threatening people, homes, and other valued resources.

Not every acre can be effectively treated to prevent rangeland fires throughout the lowlands in Walla Walla County, nor can every acre impacted by fire be restored. Setting priorities for prevention, suppression, and restoration is essential to increase the efficiency of operations and the efficacy of treatments. The use of risk-based, landscape-scale assessments help prioritize treatment areas to reduce fire risk as well as set priorities to strategically guide the allocation and pre-positioning of resources for fire suppression. To facilitate a mutual understanding of wildfire risks specific to commonly known areas in the County, the landscape- level wildfire risk assessments in the following sections are based on four predominant landscape types that exhibit distinct terrain and wildland fuels. The four landscapes identified from the Fire Regime

Condition Class data for the assessments are: agricultural lands, Shrub/Steppe, Dry Forest with heavy fuel loads, and Moist Forests with moderate loads. These landscapes, although intermixed in some areas, exhibit specific fire behavior, fuel types, suppression challenges, and mitigation recommendations that make them unique from a planning perspective.

Fire Behavior Factors

Weather

Weather has a direct influence on both fire starts and fire behavior, with fuel moisture changing as a factor of relative humidity, precipitation and temperature ranges. The fuel classes; 10-, 100-, and 1000-hour fuels are based on the amount of time it would take for 2/3rd of the dead fuel to regulate to the atmospheric conditions. Fuels within the 10-hour classification, such as grasses and dead leaf materials, respond to the atmospheric conditions with a 10-hour lag, and likewise 100-hour fuels have a respective time lag. Additionally, weather can contribute to fire behavior as a driver of extreme fire conditions such as wind-led active crowning events, and the distance fire brands can be cast.

Topography

The vast majority of Walla Walla County has a rolling topography that is primarily used for agriculture. Fuels (which are typically thermally thin and require little energy to drive out moisture) and weather are the driving factors for fire behavior within the agriculture and sagebrush-steppe systems, while topography plays a minor role in fire behavior. Moving into the Blue Mountains, on the other hand, topography plays a major role in fire behavior. Radiant energy from fuels burning downslope pre-conditions upslope fuels by driving out moisture, and as the fire moves forward less energy is needed for ignition increasing the rate of spread. Increased slopes not only influence fuel moisture but also make it more difficult on suppression efforts.

Fuels

Agriculture Lands

The gentle terrain and soils that dominates Walla Walla County facilitates extensive farming. Agricultural fields occasionally serve as fuel for fire after curing; burning in much the same manner as low grassy fuels. Fires in grass and rangeland fuel types tend to burn at relatively low intensities with moderate flame lengths and only short-range spotting. Common suppression techniques and resources are generally quite effective in this fuel type. Homes and other improvements can be easily protected from direct flame contact and radiant heat through adoption of precautionary measures around structures. Sagebrush-Steppe landscapes with a significant shrub component will have much higher fuel loads with greater spotting potential than grass and agricultural fuels. Although fires in agricultural and rangeland fuels may not present the same control problems as those associated with large, high intensity fires in timber, they can cause significant damage if precautionary measures have not been taken prior to a fire event. Wind driven fires in these fuel types spread rapidly and can be difficult to control. During extreme drought and when pushed by high winds, fires in agricultural and rangeland fuels can exhibit extreme rates of spread, which complicates suppression efforts.

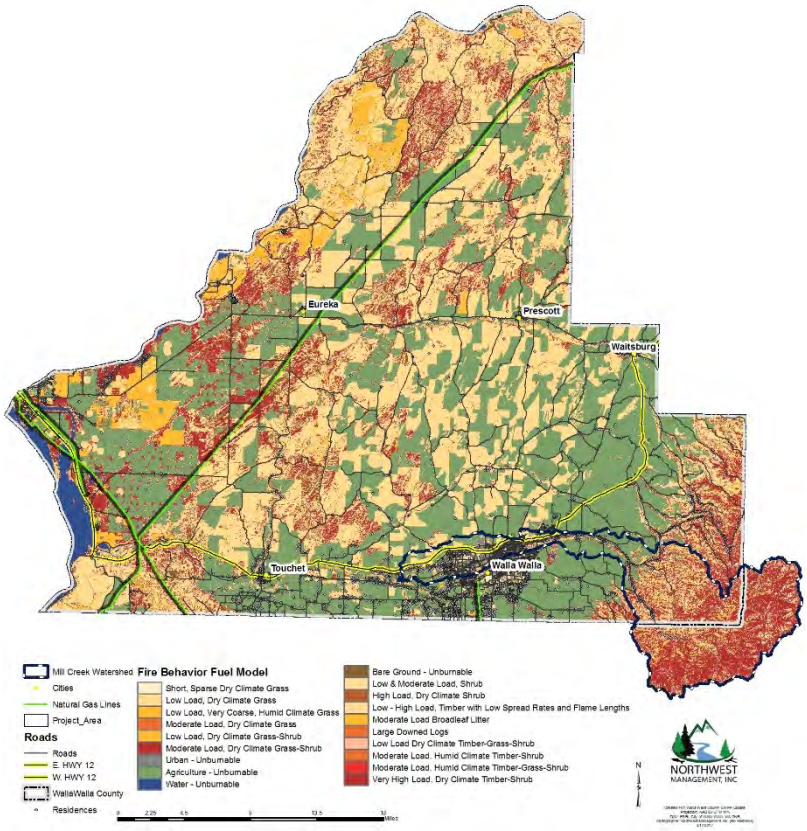


Figure 9. Fire Behavior Fuel Model for the Project Area

Sagebrush-Steppe/CRP Lands

The presence of invasive annual grasses has increased the fuel continuity throughout the CRP and sagebrush-steppe landscapes. Historic fires throughout the prairie landscape are difficult to determine the extent and severity, but are believed to be much more frequent and less severe than the fire regime that currently exists. Change in fire regimes is in large part due to the increased fuel continuity, but also can be attributed to the characteristics of the change in fuels. Invasive grasses green up and become desiccated much earlier than native species altering the fire seasons and modifies the plant communities to favor the invasive.

Dry Forest – Heavy Loads

Forested systems within the project area are located in the Mill Creek Watershed and along the Blue Mountains north of the watershed boundary. The exclusion of fire, for over 100 years, from the watershed and suppression of fire on Federal lands within the project boundaries has resulted in an increase in fuel loads. Dry forests (encompassing 2/3rd of the total forested acres of the project area) within the Blue Mountains historically experienced fire on a mean return interval of 20 years and experienced low to moderate severity fires that were rarely stand replacing. Current fuel loads and distribution has created a situation that promotes stand replacing fire, with increased ladder fuels, fuel continuity (both surface and canopy fuels), and the collection of woody debris on the forest floor. Fire behavior in the Dry Forest with increased fuel loadings can be extreme with active crown fires occurring under certain climatic conditions. Suppression of wildfires during extreme conditions is nearly impossible and exceedingly dangerous.

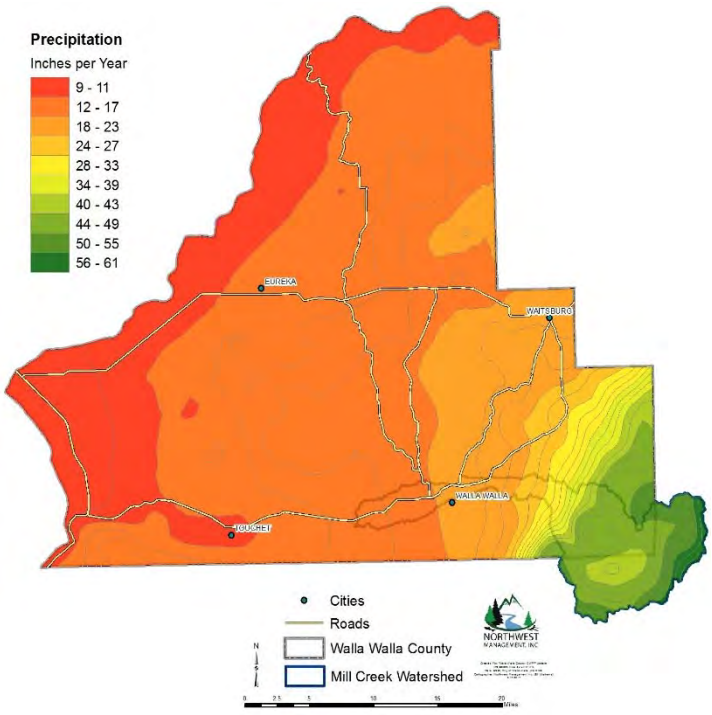


Figure 10 Walla Walla County Precipitation Data from the PRISM model

Moist Forest – Moderate Loads

Classification of moist forests in and around the Mill Creek Watershed resulted in an estimated 1/3rd of the total forested acres. Forest within this classification historically experienced a 40-year mean fire return interval, and experienced low to moderate severity with stand replacement occurring between every 40 to 200 years. Fire behavior is typically less extreme than fires occurring in the Dry Forest system. While passive crowning may occur, only under extreme climatic condition will active crown fires occur.

Canopy Fuels

While surface fires dominate fire activity within the project area, ladder fuels and canopy characteristics can lead to crown fires. Passive crown fires, or a single tree catching fire and burning, are common in a forested system with increased fuel loads. Active crown fires need to have, ladder, crown fuels and weather conditions that promote fire progression through the forest canopy. Canopy fuel continuity is a major driver for active crown fires, and wind can propel crown fires to become independent from the surface fires through increased flame deflection, essentially increasing fuel continuity within the crown (Van Wagner, 1977).

Wildfire Hazard Assessment

Historic Fire Occurrence

Fire locations were collected using the MODIS sensor, on the TERRA and AQUA satellites, for fire observations from 2000 through 2017. The MODIS sensors acquire 4 images a day for each location on the ground. Fires that were ignited and suppressed in between observations are not included within the fire start locations. Likewise, small fires that emit a low amount of energy, burning of ditch banks and small pile burnings, may not be seen by the satellite. The fire starts data identified a total of 37 fires located within the boundary of the Mill Creek Watershed and an additional 2885 fires throughout the rest of Walla Walla County, between the years of 2000 and 2017. The satellite cannot differentiate between agricultural fires and wildfires, so the number of wildfire starts will be much lower than the satellite estimated fire starts.

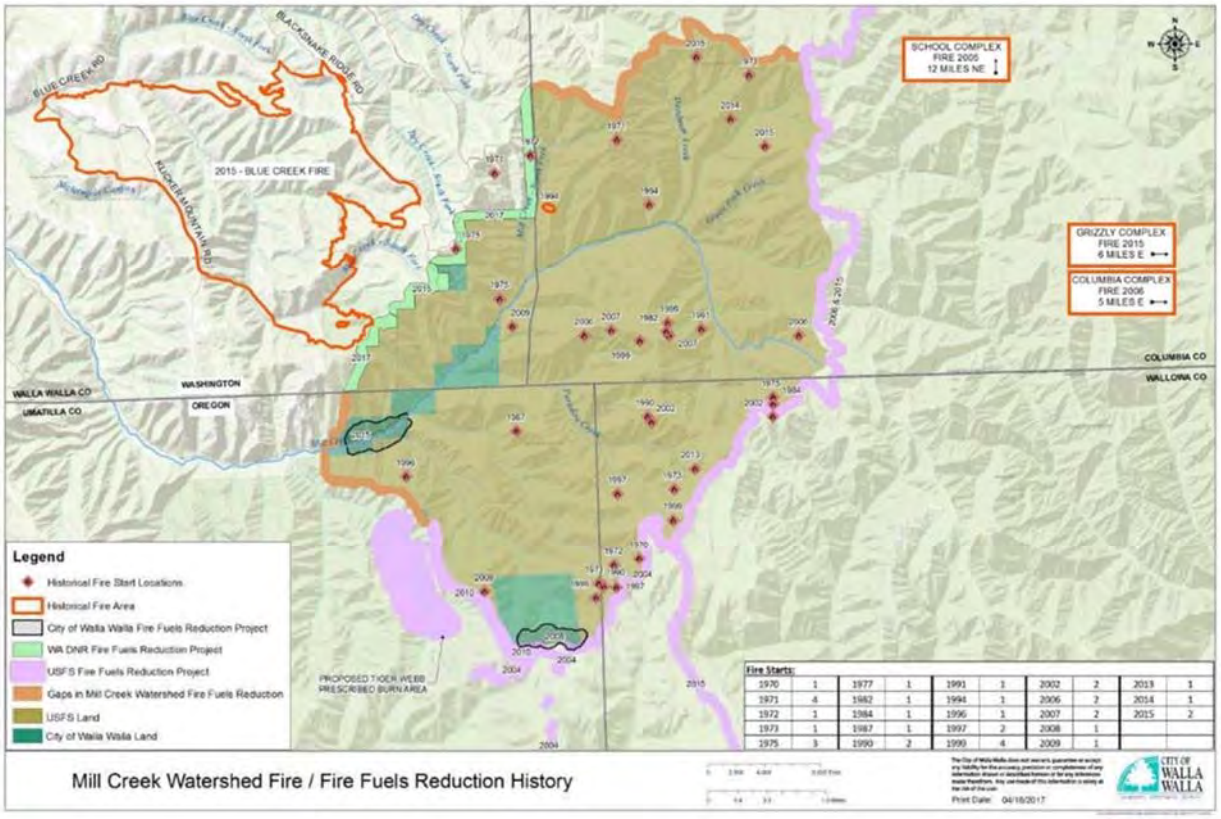


Figure 11 Fire start history for the Mill Creek Watershed from 1970 to 2015

Rate of Spread and Crown Fire Potential

There are many factors that determine both the rate of spread that the potential that a fire will become either an active or passive crown fire. Rate of spread is determined by the surface area to volume of fuels, fuel moisture content, wind speed, horizontal fuel continuity, topography, among other factors. Fire propagation models allow for the calculation of fire spread rates by incorporating all the necessary factors and typically users are allowed to adjust certain variables like wind speed and fuel moisture contents. Understanding how a fire will move across the landscape can aid in the suppression efforts and maintaining the safety of firefighters and the public. Similarly, the modeling of a surface fire progressing to a crown fire requires the inclusion of multiple factors including; vertical fuel continuity, fuel moisture content, surface fire energy output, wind speed, and more. During the analysis process using the FlamMap model, multiple variants for weather and fuel moisture levels were used to determine rates of spread and crown fire potential under multiple scenarios.

Relative Threat Level Mapping

Risk Categories

Based on analysis of the various modeling tools, existing historical information, and local knowledge, an assessment of potentially high wildfire risk areas was completed. This assessment prioritized areas that may be at higher risk due to non-native or high fire risk vegetation, fire history profile, and high-risk fuel models.

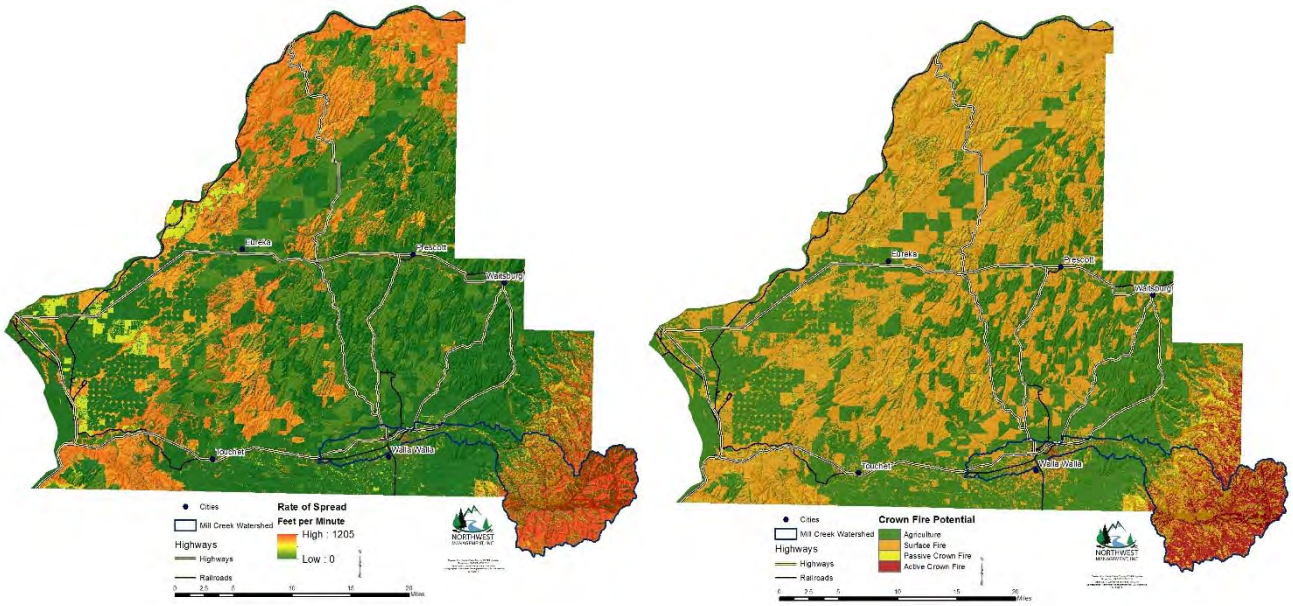


Figure 12. Rate of Spread with 30 mph winds and mid-summer average fuel moisture. Crown Fire Potential from FlamMap under 30 mph winds and mid-summer average fuel moisture contents within FlamMap.

Risk categories included in the final Relative Threat Level analysis were slope, aspect, weather and climate, fuel models, flame length, crown fire potential, and rate of spread. The various categories, or layers, were ranked based on their significance pertaining to causal factors of high wildland fire risk conditions or protection significance. The ranked layers were then analyzed in a geographical information system to produce a cumulative effects map based on the ranking. Following is a brief explanation of the various categories used in the analysis and the general ranking scheme used for each.

- Environmental Factors – slope, aspect and weather all can have an enormous impact on the intensity of a wildfire. Therefore, areas with steep slopes, dry aspects, or lesser amounts of precipitation, relative to Walla Walla County, were given higher threat rankings.

- Vegetation Cover Types – certain vegetation types are known to carry and produce more intense fires than other fuel types. For Walla Walla County, forest types (shrub understory) fuel models and shrub / grass fuel models were given the higher rankings followed by short

grass / agriculture.

- Fire Behavior – areas identified by fire behavior modeling from FlamMap as having high rate of spread potential or high fire intensity were given a higher threat level ranking.

Each data layer was developed, ranked, and converted to a raster format using ArcGIS 10.1. The data layers were then analyzed in ArcGIS using the Spatial Analyst extension to calculate the cumulative effects of the various threats. This process sums the ranked overlaid values geographically to produce the final map layer. The ranked values were then color coded to show areas of highest threat (red) to lowest threat (green) relative to Walla Walla County.

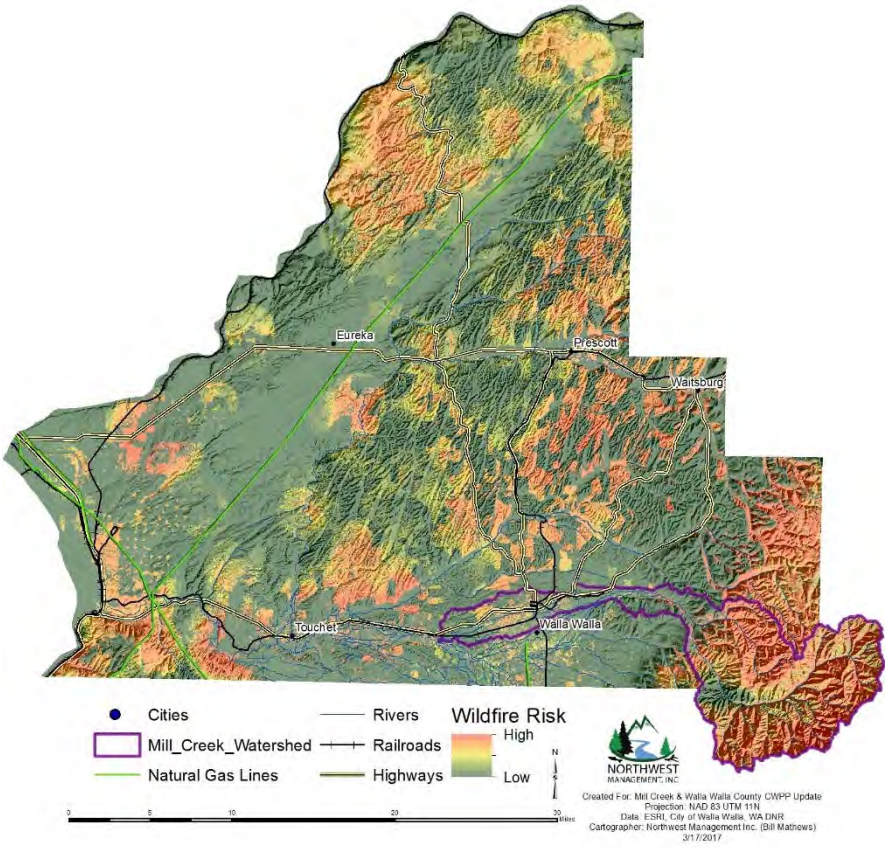


Figure 13 . Risk map for Walla Walla County and the Mill Creek Watershed. Fire threat analysis is the precursor to risk analysis and includes physical features such as slope and aspect, along with vegetative factors as in fuel loads, fuel moisture content, and weather factors, such as wind speed, relative humidity, etc. Risk assesses the when the threat of wildfire coincides with human development and important ecosystem services, for instance the Mill Creek Watershed that provides drinking water to the citizens of the City of Walla Walla.

Summary

Walla Walla County contains over 90% agriculture lands with scattered sagebrush steppe and CRP land intermixed throughout the prairie, the eastern edge of the County rises into the Blue Mountains with the transition from sagebrush to a conifer forest system. Development in the prairie is scattered with farm houses and farming structures dispersed throughout with very low density, structures within the prairie can be long distances from EMS assistance. Development within the Blue Mountains front range is more concentrated and occurs along drainage bottoms and ridgelines, structures within these areas are typically long distances from emergency management services and have poor access. This poor access

and long travel distances requires some effort on the property owner to mitigate against wildfires.

Creating a community that is resilient to wildfires begins with identifying where the threat of wildfire may occur and mitigating against the risk of wildfires against property, life, and infrastructure. The process of mitigation, when mitigation is focused on a landscape scale, creates healthy ecosystems and more resilient communities.

A wildfire threat analysis and mapping provides firefighters and managers with an idea of where wildfire may occur under various physical and environmental conditions. The threat analysis includes fire start locations (Data from: 2000 - 2017), fuels, fuel moisture, rate of spread, flame length, crown fire potential, and historic fire locations. Risk analysis and mapping takes the threat of wildfire and assesses where the threats coincides with infrastructure, cultural and environmental resources, and residences within the wildland urban interface.

Risk analysis showed that the southwestern corner and the northern portion of Walla Walla County, with scattered areas between Eureka Flats and the City of Walla Walla, were more at risk

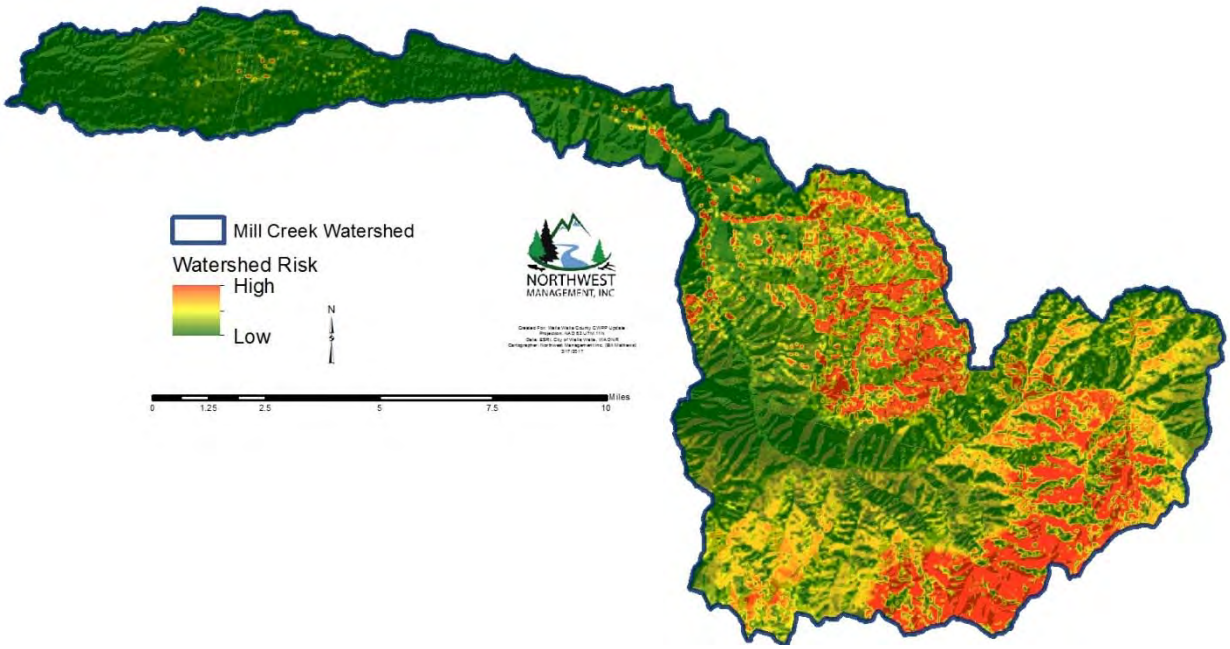


Figure 14 Mill Creek Watershed Risk Analysis, based on fuel loads, flame lengths, and crown fire potential under moderate late summer and early fall conditions.

than others across the prairie landscape. This is due to the number of fire starts, proximity to EMS, Fuels, Fire History, and locations of developed properties in these areas.

Fire suppression within the Mill Creek Watershed over the last century has led to a deviation from the historical ecosystem norms producing an accumulation of fuels. The lack of access within the watershed make mitigation and suppression efforts difficult. Mill Creek Watershed is more at risk in the timbered portions of the WUIZ, where the majority of the increased fuel loads are found, which leads to increased flame lengths and a higher potential for crown fires. The increased potential for crown fires leads to a higher probability for stand replacement/higher severity events, which in turn leads to secondary fire effects such as; erosion, alteration of site productivity, latent mortality of trees and wildlife, and the change in wildlife habitat.

Chapter 7

Community at Risk Analysis and WUI-Zone Ratings

Introduction

Fire was once an integral function within the majority of ecosystems in Washington. The seasonal cycling of fire across most landscapes was as regular as July, August and September lightning storms. Depending on the plant community composition, structure, and buildup of plant biomass, fire ignitions and fires of varying intensities and extent have been a part of this landscape. Shorter return intervals between fire events often resulted in less dramatic changes in plant composition.[9]

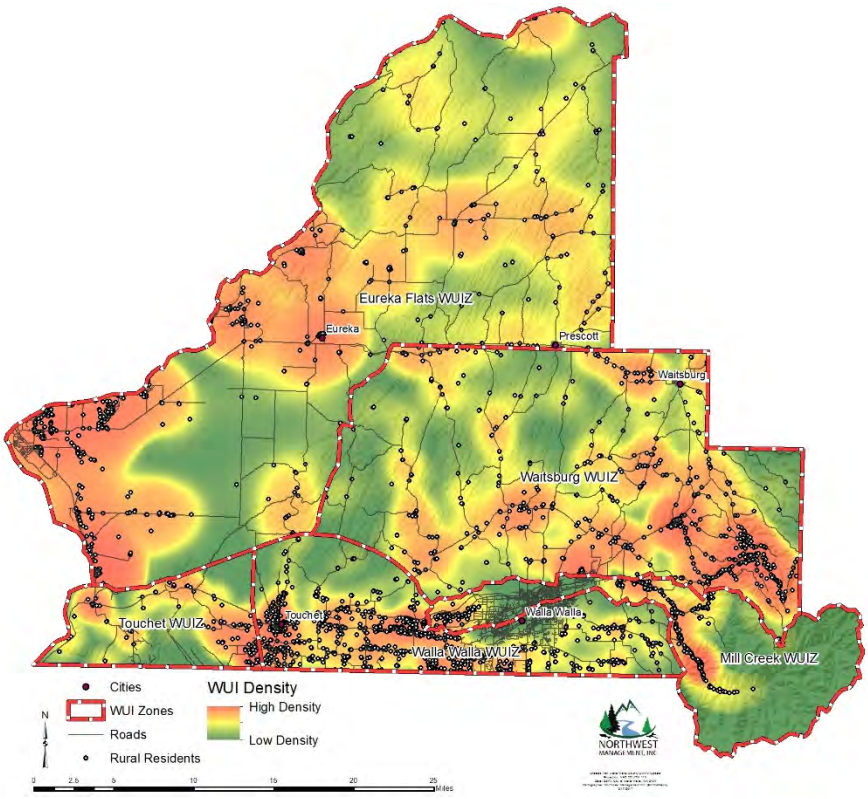


Figure 15 Wildland Urban Interface, based on each individual WUI Zone.

These fires occurred every 1 to 47 years with most at 5- to 20-year intervals.[10] Infrequent return intervals mean plant communities can burn more severely and be replaced by vegetation different in composition, structure, and age.[11] For example, native plant communities in this

[9] Johnson, C.G. 1998. Vegetation Response after Wildfires in National Forests of Northeastern Oregon. 128 pp.

[10] Barrett, J.W. 1979. Silviculture of ponderosa pine in the Pacific Northwest: the state of our knowledge. USDA Forest Service, General Technical Report PNW-97. Pacific Northwest Forest and Range Experiment Station, Portland, OR. 106 p.

[11] Johnson, C.G.; Clausnitzer, R.R.; Mehringer, P.J.; Oliver, C.D. 1994. Biotic and Abiotic Processes of Eastside Ecosytems: the Effects of Management on Plant and Community Ecology, and on Stand and Landscape Vegetation Dynamics. Gen. Tech. Report PNW-GTR-322. USDA-Forest Service. PNW Research Station. Portland, Oregon. 722pp.

region have developed under the influence of fire and adaptations to fire are evident at the species, community, and ecosystem levels across the landscape.

Fire history data for Walla Walla County is largely unknown. Local knowledge suggests that Native Americans frequently used fire on the landscape which would have played an important role in shaping the vegetation throughout County. The Bureau of Land Management is currently helping to fund research targeted at identifying the fire history in central Washington through fire scars and charcoal deposits. Within this plan the detailed records of Walla Walla County fire ignitions were collected from satellite imagery and used in the threat analysis process. A total of 3,061 ignitions were recorded by satellites within the project area between 2000 and 2016. These ignitions include agricultural burns, prescribed burns, and other uses of fire as well as natural fire as the satellite has no ability to differentiate between fire-type. Recent, 1990 – current, public fire records were also used to determine the potential of a fire occurring within Walla Walla County and/or the Mill Creek Watershed. This chapter looks at the individual WUIZs, examines the risk to communities, and assesses the potential mitigation projects that would help make residences and communities more resilient to wildfire.

Mill Creek WUIZ

The Mill Creek Watershed spans 36 square miles and contains approximately 300 homes along Mill Creek and Blue Creek Roads. The successful suppression of wildfires within the boundaries of the watershed over the last 100+ years has led to an accumulation of fuels that typically result in more intense and uncontrollable fires. Fire-start data shows that the watershed received 37 fire ignitions between 1970 and 2015. Access to the watershed is extremely limited due to the watershed's roadless area designation since 1918. Mill Creek Road extends into the lower reaches of the watershed, giving access to the City's water-intake facility.

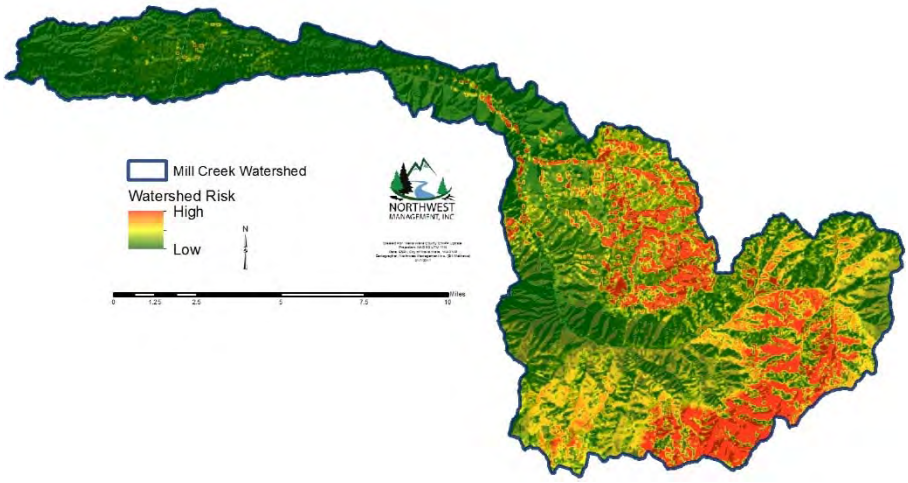


Figure 16 The risk of wild fire occurring within the watershed based on the threat analysis.

U.S. Forest Service Roads 64 and 65 line the boundary of the upper portion of the watershed along the western, southern, and eastern edges. Table Rock lookout houses a Walla Walla City-funded U.S. Forest Service employee that monitors the watershed for ignitions during the fire season. Additionally, the watershed is patrolled by one Forest Service employee and one City employee, that is housed at the intake facility.

Fire fuel modeling efforts show over 23,000 timbered acres as having extensive and at-risk fuel load levels for what is considered a dry forested system as well as similar fuel risk levels across nearly 10,000 acres of shrub/grass ecosystem type lands. Fire behavior in both these ecosystems commonly exhibits extreme behavior of severity and spread under typical climate factors during a fire season.

Mitigation Activities

Burn Permits

The Washington DNR burn permits regulate silvicultural burning. Washington Department of Ecology (DOE) is the primary agency issuing burn permits for improved property and agricultural lands. All DOE burn permits are subject to fire restrictions in place with WA DNR and local Fire Protection Districts. Washington DNR has a general burning period referred to as "Rule Burn" wherein a written burn permit is not required in some low to moderate fire dangers. The annual period for Rule Burning is from October 16th to June 30th. Washington DNR allows debris piles for Rule Burns to be ten foot (10') tall forest, yard, and/or garden materials. From July 1st to October 15th if Rule Burns are allowed they are limited to four foot (4') piles.

Defensible Space

During the Columbia Complex and Grizzly Bear Complex multiple shaded fuel breaks were constructed along stretches of the upper boundary of the watershed on Forest Roads 64 and 65. Additionally, during the spring and summer of 2017 the Washington DNR has provided funding and awarded a contract for an additional shaded fuel break along the northwestern portion of the upper watershed. Cooperation between the Department of Corrections and Walla Walla County Fire Districts provided an inexpensive means for land owners to create defensible spaces around homes and structures using the Department's work crew. At the time of this plan over 80

landowners have used the fuels reduction program to create defensible space, and the majority of these landowners are in or around the Mill Creek Watershed.

Accessibility

As a designated roadless area access to the upper portions of the Mill Creek watershed are limited to Forest Service roads 64 and 65 that run along the eastern, southern, and western borders of the watershed. Mill Creek Road extends into the watershed approximately 16 miles from the City of Walla Walla and terminates at the City's water-intake facility. Access roads and driveways are a limiting factor for firefighter response time and a potential bottle neck if evacuations were required.

Fuels Reduction and Restoration

Landscape scale restoration and fuel reduction within the watershed is largely cost prohibitive and time consuming at the current time due to the lack of roads and maintained trails within the watershed. Fuels reduction projects to date have focused on the perimeter, with a limited number of minor projects occurring within the watershed itself. These have all been in attempts to keep fires from entering the watershed from outside.

Wildfire Potential

The removal of fire from the ecosystems within the Mill Creek Watershed has led to increased fuel loads and the lack of access has made initial attacks of fire starts difficult and costly. Fire start histories show that there have been numerous fire starts within the watershed each year since 2000. The combination of attributes such as increased fuel loads, numerous fire starts, limited access, and dryer conditions does put the watershed and WUI Zone at risk for a potentially severe and forest-replacing fire that would severely impact the water supply infrastructure for the City of Walla Walla.

Fire Protection

Walla Walla County Fire Districts 4 and 8 are responsible for the structures within the Mill Creek watershed and share the responsibility for forest fires on the Washington side with the WA DNR and the Forest Service. The Oregon Department of Forestry is responsible for the watershed areas across the border in Oregon. District 4 has 10 career staff members and 65 volunteer firefighters, officers, EMT's, First Responders, and support personnel. District 4 responds to

roughly 300 fire events annually that include both structural and wildland fires. District 8 has approximately 30 volunteer firefighters, and as a volunteer department struggles to staff fires during the fire season as the volunteers are often overcommitted.

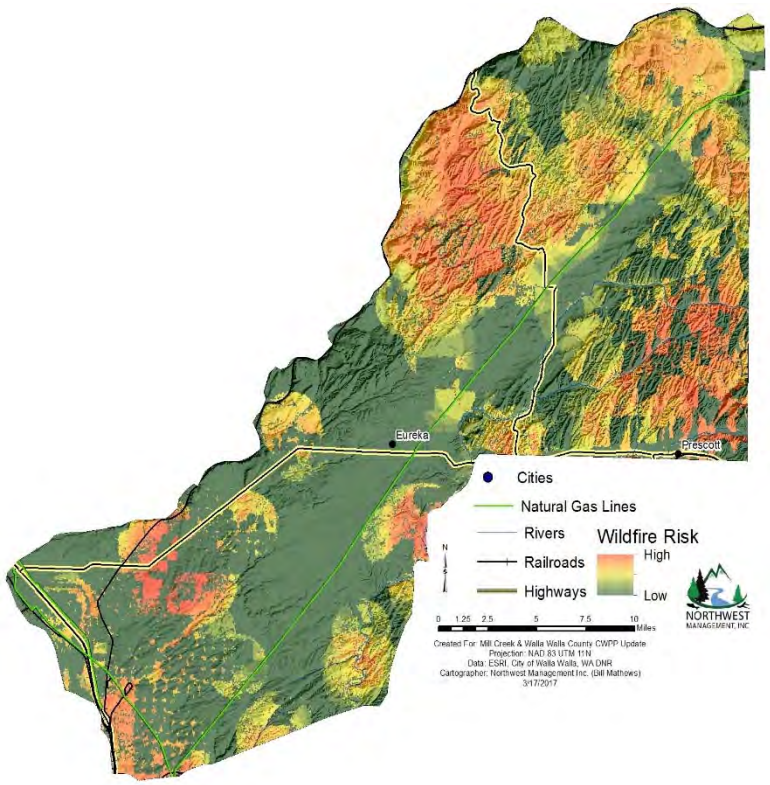


Figure 17 Eureka Flat a map of fire risk across the WUIZ

Eureka Flat

Eureka Flat WUIZ. Eureka Flat developed from glacial outwash that created a depressional plain that acted as a depositional area for flood and eolian sediment. Typical vegetation found throughout this landscape is grass, mixed shrub and sagebrush with areas of wetlands, cultivated crops, and Conservation Reserve Program (CRP) fallow land.

Mitigation Activities

Defensible Space

Effective mitigation strategies begin with public awareness and campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Walla Walla County must be aware that home defensibility starts with the homeowner. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home and its surrounding proximity. “Living with Fire, A Guide for the Homeowner” is a nationally available set of information and an excellent tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents of Walla Walla County should be encouraged to work with local fire departments and fire management agencies within the County to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations. Beyond the homes, forest management efforts must be considered to slow the approach of a fire that threatens a community.

Accessibility

Accessibility in the Eureka Flat WUIZ is limited with few developed road systems. Many undeveloped gravel roads spider web through and around the exiting private structures and landownerships. State Highway 124 cuts across the middle of the flat before turning South and connecting with Highway 12. Lyons Ferry Road follows the Flat from its junction with Highway 124 until it connects back up with Highway 261 and Lyons Ferry State Park.

Fuels Reduction and Restoration

Outside of Burbank and Attalia, the Flat is primarily agriculture lands that border large tracts of Conservation Reserve Program (CRP) lands on either side of the Flat in the typical rolling hills of the Palouse. Much of the land north of the Flat is currently in CRP lands, which pose a significant risk for fire control as there are continuous fire fuels and no existing fire breaks. Tilling of CRP land for a fire break removes it from the program and reduces the amount of compensation a landowner receives for keeping the land out of production. This creates a disincentive for some, and poses a greater fire risk to others. Mitigation efforts such as tilling are in direct competition with revenue desired by local landowners, so there is a need to alter or modify CRP regulations to allow for fire breaks.

Wildfire Potential

North of Eureka Flat exhibits the geology of the typical rolling hills on the Palouse, the land in this area is predominantly enrolled in the CRP program. Historic fire occurrence and the fire risk analysis places the majority of the wildfire potential in the CRP land north of Eureka Flat and a mix of fire risk levels in the CRP/Farming lands south of Eureka Flat. The mixed fuels and steep, variable terrain across this landscape are very conducive to rapidly spreading wildfires. During a wildfire event, families in threatened structures would have very little time to protect their homes and evacuate. Due to the location of fire suppression services, response times would be slow compared to other areas within the County. Response may also be limited in many areas due to inadequate access roads and water supplies. Therefore, it is critical that a defensible space is established and maintained around structures prior to any ignition. Keeping a clean and green yard and using fire resistant construction materials on homes and other structures will significantly reduce the risk of loss to fire and increase the resilience of structures to sparks.

Fire Protection

Walla Walla County Fire District 1 covers 310 square miles of the Eureka Flat WUIZ in the Northern area of the County. With only 90 residents this Fire District struggles to maintain an active volunteer base able to respond to calls. Fire District 1 encompasses large tracts of CRP land with little or no fire breaks. The agricultural aspect of the area brings in large groups of seasonal workers thereby increasing the likelihood of accidental human caused fires. Fire District 3 faces similar struggles as District 1 in that it is staffed by volunteers that are required to cover 137 square miles of land where large tracts of CRP, with very few natural fire breaks, dominate. This District also struggles to maintain a large enough volunteer base to respond to all the calls. Covering the Western tip of Walla Walla County Fire District 5 also relies on volunteers. The majority of the land in the District is active agriculture, both dryland and irrigated crops.

Walla Walla Valley

Walla Walla Valley WUIZ contains portions of the City of Walla Walla and outlying residential areas. Roughly 90% of the land in this WUIZ, outside of the urban developed areas, is active agriculture with a small percent of CRP land North of Touchet. This WUIZ landscape transitions into the foothills of the Blue Mountains in the Southeastern corner.

Mitigation Activities

Accessibility

Highway 12 cuts through the Western half of the WUIZ. Access in and around Walla Walla is well developed due to the largely urban setting. Access in the CRP land and the foothills of the Blue Mountains is more limited than the other areas within this WUIZ.

Fuels Reduction and Restoration

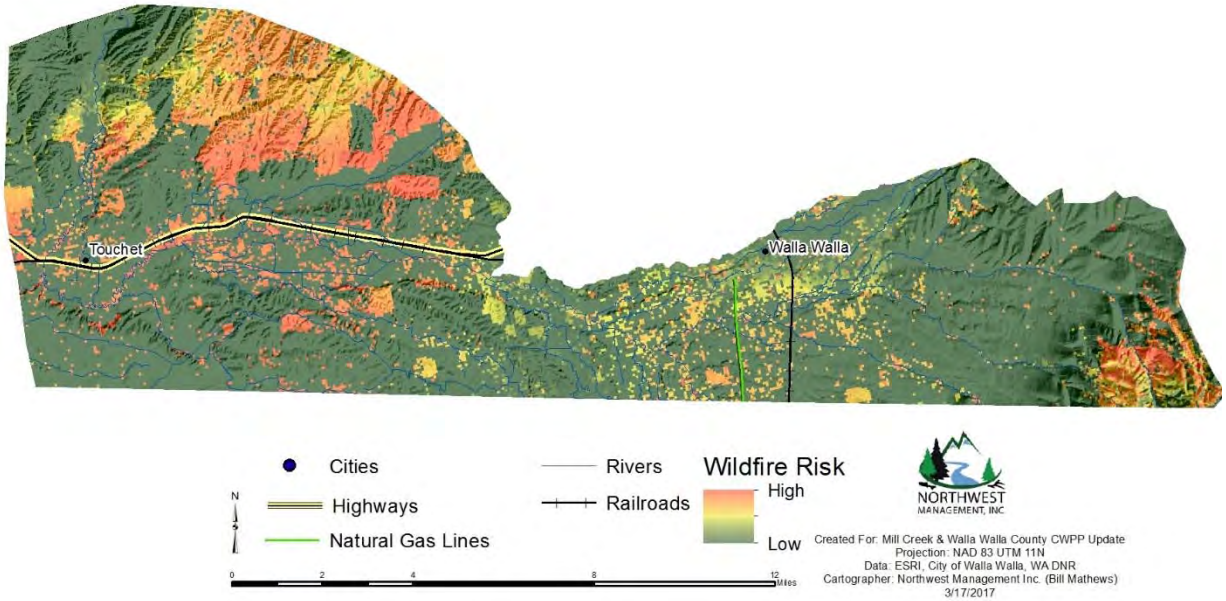


Figure 18 Fire risk for Walla Walla Valley WUIZ

The CRP lands and the foothill areas in the Southeastern corner of the WUIZ are predominantly undeveloped or not actively farmed. Fire breaks within the CRP lands would help control wildfires that occur in that area. Due to the low density of residents in this area, construction of fuel breaks along CRP land would protect a handful of homes and may be more easily accomplished. Citizen education, defensible space mitigation activities such as those presented by FIREWISE, and the use of fire resistant construction materials for homes would increase the areas resilience to fire where fuel breaks are not present. In the Blue Mountain foothills areas, in the southeastern corner, shrub and grasslands on Southern aspects slopes and timber/brush vegetation on the Northern aspects should be monitored and managed as needed to maintain a spacing and fuel load similar to fire adapted ecosystems to aid fire suppression efforts.

Wildfire Potential

The potential of a wildfire from the threat and risk analysis identifies the greatest risk of wildfire within the CRP lands and in the foothills of the Blue Mountains. The lesser risk of fire within the developed land and active agricultural areas is a result of less flammable material use and active cultivation. The relatively isolated and less developed rural and wildland areas surrounding Walla Walla provide potential ignition points for wildfires and the potential of those fires to travel into the developed areas of the WUIZ.

Fire Protection

Walla Walla Valley WUIZ receives fire support from both Fire District 4 and 6. District 4 has 10 career staff members and 65 volunteer firefighters, officers, EMT's, First Responders, and support personnel. District 4 annually responds to roughly 300 actual fire events, both structural and wildland. District 6 is staffed by 30 volunteers and covers 220 square miles of mostly dryland farming, Conservation Reserve Program (CRP) and rangeland with some irrigated acres.

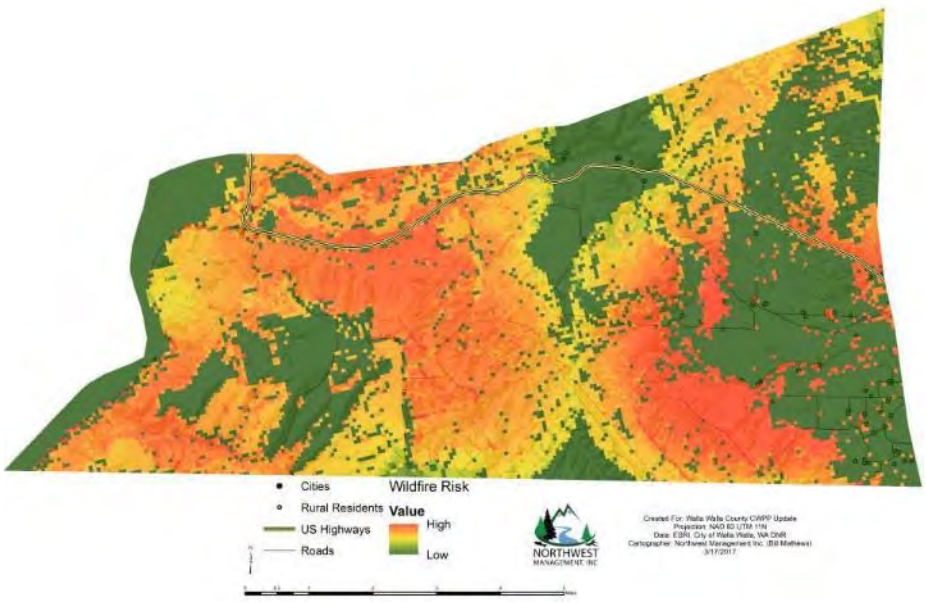


Figure 19 Fire Risk for Touchet WUIZ

Touchet

The Touchet WUIZ contains a mixture of dry and irrigated agricultural land and natural sagebrush steppe ecosystem. Touchet WUIZ is bordered on its western side by the Columbia River, and it shares its Southern border with Oregon. It also lies at the Southern border of the Eureka Flat geological formation. A wind farm runs from Washington into Oregon, South of Highway 12, with over 200 wind turbines on the Washington side.

Mitigation Activities

Accessibility

Highway 12 forms a portion of the Northern border for the WUIZ and Highway 730 runs along the Columbia River on the Western border. Hatch Grade Road gives access to the wind farm, agricultural land, and the natural vegetation conditions that exist along the Washington-Oregon border.

Fuels Reduction and Restoration

Fire breaks around the wind turbines, and other structures would help mitigate wildfire risk from fires that occur in that area. Due to the low density of residents in this area, education and defensible space construction would add a significant level of protection and security where fuel breaks are not feasible and where response times of fire suppression resources are lengthened.

Wildfire Potential

The risk of wildfire in this WUIZ is high due to the fuel conditions and the natural composition a sagebrush steppe ecosystem that traditionally experiences fire on a 5 to 20 year rotation. With the introduction of invasive species such as cheatgrass, the naturally short fire return interval can be further reduced and fires can be larger in extent and burn at higher rates of speed and with greater intensity.

Fire Protection

Walla Walla County Fire District 6 is located in the SW portion of Walla Walla County and services 220 square miles. The area consists mostly of dryland farming, CRP, and rangelands with a limited extent of irrigated acres. The District has mutual aid agreements in place with all the Districts throughout Walla Walla County, with the DNR, and the Federal Fish and Wildlife agencies. The District has eight EMT's and eight EMR's as well as 19 structural, 17 Red carded and 26 EVAP certified personnel. The District has two stations; one (S61) located in Touchet and one (S62) located in Lowden.

The District average's 180 calls for service per year and 60 percent of those calls are for EMS service and 40 percent are for fire. This WUIZ area has a high natural-cover fuel load and the potential for a substantial wildland fire.

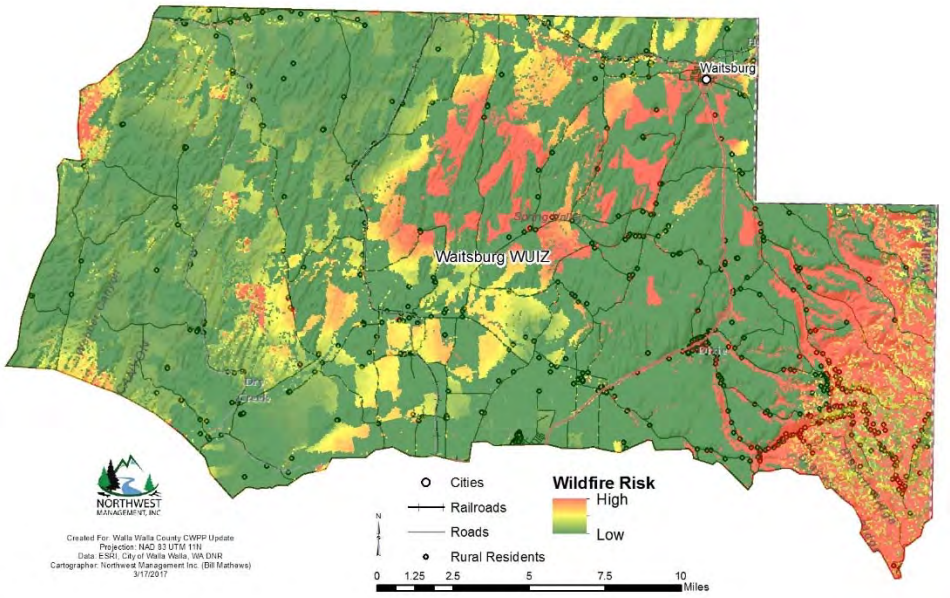


Figure 20 Fire Risk for the Waitsburg WUIZ

Waitsburg

The Waitsburg WUIZ contains large tracts of agricultural lands across the Palouse with smaller parcels of CRP land intermixed with active farms. The Eastern edge of the WUIZ extends up into the Blue Mountains where vegetation shifts from grasslands and agriculture to open grassy faces on the Southern aspects, and timbered draws on the Northern facing aspects. Topography is similar to that of the Mill Creek Watershed making it difficult to apply fuel treatments and orchestrate fire suppression efforts without adequate roads or established and maintained access trails.

Mitigation Activities

Burn Permits

The Washington DNR burn permits regulate silvicultural burning. Washington Department of Ecology (DOE) is the primary agency issuing burn permits for improved property and agricultural lands. All DOE burn permits are subject to fire restrictions in place with WA DNR and local Fire Protection Districts. Washington DNR has a general burning period referred to as "Rule Burn" wherein a written burn permit is not required in some low to moderate fire dangers. The window of use for the Rule Burn permits is from October 16th to June 30th. Washington DNR allows for Rule Burns to cover a ten foot (10') pile of forest, yard, and garden debris. From July 1st to October 15th Rule Burns may be allowed on a season-by-season basis and are limited to four foot (4') piles of the same materials.

Defensible Space

Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Walla Walla County must be made aware that home defensibility starts with the homeowner. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home and its surrounding areas. “Living with Fire, A Guide for the Homeowner” is an excellent public access tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents of Walla Walla County should be encouraged to work with local fire departments and fire management agencies within the County to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations. Beyond the homes, vegetation management efforts must be considered to slow the approach of a fire that threatens a community.

Accessibility

Highway 12 and 125 runs North-South through the WUIZ and Highway 124 runs East-West across the Northern boundary. A network of roads runs throughout the agriculture areas providing reasonable access in most locations. Roads within the Blue Mountains are located in the bottom of drainages and on top of ridgelines providing some access for fuels treatments and fire suppression efforts.

Fuels Reduction and Restoration

Fire breaks within the CRP lands would help control a wildfire that occurs in that area. Currently, the population surrounding these CRP lands has a low density and is widely dispersed. Due to the low density of residents in this area construction of fuel breaks along CRP land would protect a handful of homes. Citizen education programs and defensible space awareness and construction would increase the resilience of buildings to fire and provide an increased level of protection where fuel breaks are not present.

The greatest risk and potential for wildfire to occur in this WUIZ is located in the Blue Mountains due to intimately burned patches of timber and brush that have experienced increased mortality since the Blue Creek fire and in some areas presents an increased fuel load for future fires. There is a patchwork of high to low probability fire areas within the CRP land in the valley. Historically

fires have occurred at a multi-decade rotation (20+ years) within the forested areas of the Blue Mountains and more regularly in the valley (5 to 20 years). The accumulation of fuels in the Blue Mountains creates the potential for a severe fire with extreme fire behavior and increased burn severity. Access here is not as limited as that in the Mill Creek Watershed providing firefighters more options for fire suppression efforts and forest-fuels management.

Fire Protection

Washington DNR is the first responder in the Blue Mountains with Walla Walla County Fire Districts 2 and 8 providing assistance. Districts 2, 7, and 8 are first responders throughout the rest of the WUIZ.

County Wide Mitigation Plans

Evacuation Plans

Development of a community evacuation plan is necessary to assure an orderly evacuation in the event of a wildland fire. Designation and posting of escape routes would increase efficient mobilization of people and more effective evacuations for fleeing residents. Community safety zones should also be established in the event of compromised evacuations. Efforts should be made to educate homeowners through existing homeowners associations or the creation of such organizations to act as conduits for this information.

Walla Walla County Emergency Management has developed and is extending a notifications system that alerts residents based on geographic location in the event of an evacuation order. Education and awareness of the program would allow the program to reach more of the community and be a more effective resource.

Accessibility

Accessibility of homes to emergency services within the WUI is critical. If a home cannot be protected safely, firefighting resources will not be jeopardized and the lives of fire protection personnel will not be risked to protect a structure. The fate of every home is dependent on the landowner and will largely be determined by homeowners' actions prior to the event. In many cases the protection of a home can be greatly enhanced by following a few simple guidelines that

increase accessibility, such as widening or pruning driveways and creating a turnaround area for large vehicles.

Fuels Reduction & Restoration

Reducing fuels, particularity the rapid spread of invasive species such as cheatgrass, is a critical part of the strategy for reducing future rangeland fires and protecting important native of desired wildland ecosystems. In addition to the installation of firebreak features wherever feasible, it is important that vegetation management, both forest and rangeland, and habitat restoration be in an integral part of the process. Recreational facilities such as campgrounds and roadsides should be kept free of excessive natural fuels and maintained.

In order to mitigate the risk of an escaped campfire, escape proof fire rings and barbeque pits should be installed and maintained. Better management of rangeland vegetation and reversing the spread of invasive non-native grasses such as cheatgrass is critical to slowing the spread of a fire and decreasing the frequency and intensity of rangeland fires. By planning projects at the landscape scale to reduce and control invasive species and rapidly restoring lands impacted by fire to native vegetation, progress in protecting and restoring Walla Walla County's unique ecosystems for the benefit of all can occur. Vegetation inventories, treatments, and preventative measures will reduce the risk of wildland fire and can be achieved through practices such as the appropriate use of herbicides, biological controls, biocides; prescribed fire, green-stripping, fuel breaks, and the prioritization of restoration to fire-adapted landscapes.

Emergency Response

Once a fire has started, how much and how large it burns is dependent on the fuels it has access to, the weather conditions and often the availability of suppression resources. In most cases, rural fire departments are the first to respond and have the best opportunity to halt the spread of a wildland fire; however lacking resources, training and staffing can be a challenge in more remote areas of a county or where districts do not overlap coverage. For many districts, the ability to meet suppression objectives is largely dependent on the availability of functional resources and trained individuals. Increasing the capacity of departments through funding and equipment acquisition as well as access and fuel reduction practices throughout a county will improve response times and subsequently reduce the risk of loss.

Chapter 8

Mitigation Items and Plan Maintenance

Plan Monitoring and Maintenance

As part of the policy of Walla Walla County in relation to this planning document, this entire Community Wildfire Protection Plan should be reviewed annually from the date of adoption. It is recommended that a special meeting of a joint planning committee open to the public and involving all jurisdictions should be established to review, update and confirm action items, priorities, budgets, and modifications. Walla Walla County Emergency Management (or an official designee of the joint committee) is responsible for the scheduling, publicizing, and leadership of the annual review meeting. During this meeting, participating jurisdictions will report on their respective projects and identify needed changes and updates to the existing Plan. Maintenance to the Plan should be detailed at these meetings, documented, and attached to the formal plan as an amendment or appendix to the Community Wildfire Protection Plan. Re-evaluation of this plan should be made on the 5th anniversary of its acceptance, and every five-year period following.

Annual Review Agenda

The focus of the joint planning committee at the annual review meeting should include at least the following topics:

- Update historical fire events record based on any events in the past year.
- Review County profile and individual community assessments for each WUIZ and note any major changes or mitigation projects that have altered the condition of each entity.
- Add a section to note accomplishments or current mitigation projects.
- Identify existing cost share programs with the ability to help citizens with defensible space or other relevant tasks related to WUI zone protection and education. Include these with appropriate links or reference in the review document materials.
- Notify the public of the review meeting outcomes and where the meeting findings can be viewed.

All meeting minutes, press releases, and other documentation of revisions should be kept on record by Walla Walla County Emergency Management.

Five Year Re-evaluation Agenda

The focus of the planning committee at the five year re-evaluation should include all of the topics suggested for the annual review in addition to the following items:

- Update County demographic and socioeconomic data.
- Address any new planning documents, ordinances, codes, etc. that have been developed by the County or cities that influence the WUI and WUI Zones specifically.
- Review listed communication sites and tools.
- Review Mill Creek resource conditions and all projects completed and planned for the watershed and the County as a whole.
- Redo all risk analysis modeling and mapping to incorporate new information such as land use changes, population expansions, and changing risk potentials.
- Update County risk profiles, potential project lists and resource needs based on new information.

All meeting minutes, press releases, and other documentation of revisions should be kept on record by Walla Walla County Emergency Management.

Continued Public Involvement

The City and County of Walla Walla are dedicated to involving the public directly in review and updates of Community Wildfire Protection Plan. The Emergency Management Director, through the planning committee, is responsible for the annual review and update of the Plan as recommended in the "Plan Monitoring and Maintenance" section below.

The public will have the opportunity to provide feedback about the Plan annually on the anniversary of the adoption at a meeting of the County Board of Commissioners. Copies of the Plan can be viewed on the Walla Walla County Emergency Management and City of Walla Walla's Websites. The Plan also includes contact information for the Emergency Management Director, who is responsible for tracking public comments.

A public meeting should be held as part of each annual evaluation or when deemed necessary by the planning committee and the Emergency Management Director. The meetings will provide the public a forum for which they can express concerns, opinions, or ideas about the Plan. The County Commissioners' Office in conjunction with Emergency Management will be responsible for using County resources to publicize the annual meetings and maintain public involvement through respective webpages, social media and local newspapers as appropriate.

Prioritization of Action Items

The prioritization process includes a special emphasis on benefit-cost analysis review. The process identifies that a key component of funding decisions is a determination of project value based on the idea that a project will provide an equivalent or greater benefit to the community throughout the life of a project when compared to costs. Projects will be administered by local jurisdictions with overall coordination provided by the Emergency Management Director.

County Commissioners and the elected officials of all jurisdictions have evaluated opportunities and established their own unique priorities to accomplish mitigation activities where existing funds and resources are available and there is community interest in implementing mitigation measures. If no federal funding is used in these situations, the prioritization process may be less formal. Often the types of projects a county can afford to do, on their own, are in relation to improved codes and standards, department planning and preparedness, education, and local cooperation. Walla Walla County will use this Community Wildfire Protection Plan as guidance when considering pre-disaster mitigation proposals brought before the Board of Commissioners by department heads, city officials, fire districts, and local civic groups.

When federal or state funding is available for hazard mitigation, there are usually requirements that establish a rigorous benefit-cost analysis as a guiding criterion in establishing project priorities. Walla Walla County understands the basic federal grant program criteria which will drive the identification, selection, and funding of the most competitive and worthy mitigation projects. FEMA's three grant programs (the Hazard Mitigation Grant Program, the Flood Mitigation Assistance Program, and Pre-Disaster Mitigation Program) that offer federal mitigation funding to state and local governments all include the benefit-cost and repetitive loss selection criteria.

The prioritization of new projects and update/deletion of completed projects will occur annually and be facilitated by the Emergency Management Director and the steering committee. All mitigation activities, recommendations, and action items mentioned in this document are dependent on available funding and staffing.

Prioritization Scheme

All of the action items and project recommendations made in this Plan were prioritized by each respective jurisdiction within the WUI Zones in coordination with their governing bodies. Each jurisdiction's representative on the planning committee met with their governing bodies and prioritized their own list of projects and mitigation measures through group discussions. Projects were ranked on a "High", "Moderate", or "Low" scale with emphasis on project feasibility and the anticipated benefit/cost outcomes. Once compiled, the individual jurisdiction rankings were discussed and approved at the committee level.

Jurisdictional Mitigation Strategies

The following tables outline all of the participating jurisdictions' wildfire mitigation strategies and potential projects for the next five-year period and in some cases beyond five years where appropriate. Action items from the previous 2006 Mill Creek Plan have been incorporated into this updated document. The committee then completed a thorough review and discussion of each new and previously-proposed project, and in some cases, chose to revise the action item or delete it altogether. The following tables detail proposed projects for the next 5-year planning period for which this plan is to guide.

Countywide Projects

Action Item	Update Fire Districts equipment, provide additional training, and recruit more volunteers.
Mitigation #1	**Preparedness**
Priority	High
Process	1. Seek funding sources including the Rural Fire Assistance (RFA) and Volunteer Fire Assistance (VFA) for each Fire District in the WUIZ to upgrade firefighting equipment and for training.
Rationale	All Districts supplied the steering committee with a list of the current assets along with a list of equipment and infrastructure needs to better serve their communities within the District. Proper equipment and training help enables firefighters to better handle emergencies and reduces the risk to life and property.
Desired Condition	A well-equipped and trained firefighting staff and volunteers.
How to implement and apply concepts	1. Identify gaps in equipment and training for each district. 2. Seek funding for equipment and training.
Timeline	On-going

Action Item	Fire Districts experience gaps in communication with dispatch throughout the county.
Mitigation #2	**Preparedness**
Priority	High
Process	1. Identify areas of gaps in the current communication coverage throughout the WUIZ. 2. Develop a system that covers the current communication gaps. 3. Review with the purpose of development.
Rationale	Communication is a key in the event of a disaster, it enables firefighters to react quickly to changes during a disaster and provide services to citizens. It is a necessity for firefighter and citizen safety.
Desired Condition	A communication system that provides County wide service without dead spots.
Timeline	On-going

Action Item	Vegetation management along roadways to reduce fire starts from vehicles.
Mitigation #3	**Fuels Reduction**
Priority	High
Process	1. Secure funding for removal of vegetation along roadways, either through spraying herbicides or mechanical removal. 2. Work with Washington Department of Transportation to maintain roadways. 3. Solicit and hire contractors to perform fuels reduction when needed.
Rationale	Human caused fires are the leading cause of wildfires, removal of fuels along roadways reduces the likelihood of fire starting from vehicles.
Desired Condition	A buffer around roadways that minimize the likelihood of a fire starting from vehicles.
Timeline	On-going maintenance.

Action Item	New home development and remodeling structures within the WUI
Mitigation #4	**County Fire Siting Standards**
Priority	High
Process	1. Consistent standards between the three counties within the Mill Creek WUIZ 2. Review Walla Walla County Code Sections 15.04.510 and 15.04.520 for possible implementation in other locations. 3. Develop standards which meet, or exceed, those in the National Fire Siting Code with emphasis on providing adequate access for firefighting apparatus and evacuation, water source, and defensible space. 4. Strong and consistent enforcement policies.
Rationale	Umatilla, Walla Walla, and Columbia Counties should review/revise their fire siting standards for new home development where deemed necessary.
Desired Condition	Structures and property that are more resilient to wildfire.

How to implement and apply concepts	1. Review fire siting standards for new structures. (WWCC 15.04.510 and .520). 2. Review standards for road access to structures (in County Building Code). 3. Review existing and potentially new standards for a primary and secondary fuel break area and maintaining adequate access to structures for firefighting equipment.
Timeline	Short Term (1-2 years)

Action Item	Public Utilities
Mitigation #5	**Underground Public Utilities**
Priority	Moderate
Process	1. Work with PP&L and CREA to evaluate and prioritize above ground electric utilities for wildfire hazards. 2. Determine which lines should be buried and seek funding to accomplish. 3. Remove hazard trees and vegetation near all above ground power lines.
Rationale	Protect critical infrastructure in the event of a wildfire.
Desired Condition	A power grid that is resilient to wildfires.
Timeline	Long Term (3+ years)

Action Item	Provide information and funding to homeowners for the creation of defensible spaces around structures.
Mitigation #6	**Defensible Space**
Priority	High
Process	1. Seek funding to continue the defensible space assistance project begun for the Oregon homes by the ODF. Place priority on homes on China Canyon Lane, Neotoma Lane, Reynolds Drive, and Emigh Lane. 2. Seek funding to expand defensible work by home-owners on the Washington side of the WIUZ. Place high priority on homes that are classified as having an Extreme or High Hazard from vegetation. 3. Use NFPA 1144 standards for establishing defensible space around home sites.
Rationale	Provide a space between wildland fuels and existing structures to reduce the vulnerability of the structures to wildfires.
Desired Condition	Structures that have minimal risk from wildfires due to the lack of fuels surrounding the structures.
How to implement and apply concepts	1. Apply for grants through the National Fire Plan and other grant programs to assist homeowners with the cost of completing defensible space around their homes. 2. Work with homeowners to show the importance of completing this effort on their own. 3. Provide technical assistance to identify how defensible space can be achieved and maintained.
Timeline	On-going

Action Item	Complete an evacuation plan for private homeowners in coordination with the Fire Districts and Emergency Management.
Mitigation #7	**Evacuation Plan**
Priority	Moderate
Process	1. Develop an evacuation plan, and utilize Emergency Management's notification system to aid in evacuations. 2. Provide public outreach and education about the plan and notification system.
Rationale	Protect life in the event of a disaster through preparation and education on evacuation measures.
Desired Condition	A citizenry that is knowledgeable on when and how best to remove themselves from a wildfire.
Timeline	Short Term (1-2 years)

Action Item	Emergency Preparedness
Mitigation #8	**Emergency Response Projects**
Priority	Moderate
Process	1. Create and strengthen mutual aid agreements between the Fire Districts and the Washington DNR, ODF, and the Forest Service. 2. Maintain easy to read house numbers on all homes within the planning area. 3. Develop water sources and agreements with landowners to use existing sources for fire use as appropriate. This would include an "Incidental Take Permit" of waters from Mill Creek by pump to fight wildfires. This would not be part of a surface water permit.
Rationale	Provide the necessary information and resources for firefighters and emergency services to perform the work efficiently.
Desired Condition	Preparedness in response to wildfires.
Timeline	On-going

Action Item	Update Washington home-site assessments for structural vulnerability
Mitigation #9	**Structure Vulnerability Assessments**
Priority	High
Process	1. Acquire funding for additional personnel or contractors to perform home assessments. 2. Provide home site assessments to home owners. 3. Perform a follow up survey to home sites that were assessed in 2002 to determine the changes following the original site assessment. 4. Apply the NFPA 1144 criteria and standards.
Rationale	While creation of a defensible space around a structure reduces the chance of a fire from burning up to a structure. Changing the building materials that are used on a home reduces the structures vulnerability to fire, should a fire occur.

Desired Condition	Structures and property that are more resilient to wildfire.
Timeline	Short Term (1-2 years)

Eureka Flat WUIZ

Action Item	Fuel breaks within the large tracts of CRP lands.
Mitigation #1	**Fuel Breaks**
Priority	High
Process	1. Identify strategic areas within the CRP land that enables for the suppression of wildfires in a safe and controlled situation. 2. Work with land owners and NRCS to come up with a solution to the removal of land from CRP without the loss of revenue to the landowner. 3. Design system to input data accumulated for easy GIS access.
Rationale	Increase safety and fire suppression capabilities for firefighters.
Desired Condition	Fuel breaks that provide a safe and manageable position for fire suppression within the CRP lands, with no financial impact to the landowners for removal of lands from the program.
Timeline	Long Term (3+ years)

Action Item	Fire Districts within the Eureka WUIZ manage large tracts of lands with very few residents. It is difficult to maintain or recruit interested volunteers with such a low population base.
Mitigation #2	**Preparedness**
Priority	High
Process	1. Identify and secure funding sources that allow for the development of a training and recruitment program to better staff the local Fire Districts.
Rationale	The Fire Districts that service the Eureka WUIZ operate on a volunteer basis. The Districts have stated a lack of interest from local citizens to volunteer in the program.
Desired Condition	Have a fully staffed and trained volunteer base that is able to serve the public within the WUIZ.
Timeline	Short Term (1-2 years)

Action Item	Invasive plant control pre- and post-fire
Mitigation #3	**Vegetation Control**
Priority	High
Process	1. Acquire funding for Vegetation Control. 2. Work with landowners to apply landscape scale vegetation management. 3. Perform vegetation surveys and build GIS database on vegetation distribution. 4. Use data to prioritize weed management projects.
Rationale	Following a disturbance event, such as a wildfire, invasive species have a high probability of spreading and dominating a site. Sagebrush Steppe has seen multiple invasive species that are favored following a fire, i.e. cheat grass, medusa head, ventenata dubia, among others.
Desired Condition	Restoration across the landscape to the historical norm for vegetation and fire regime conditions.

Timeline	On-going

Umatilla National Forest and the Mill Creek WUIZ

Action Item	Fuel reduction around Mill Creek Watershed
Mitigation #1	**Reduce Hazardous Fuels**
Priority	High
Process	1. Identify areas around the Mill Creek Watershed that have an accumulation of fuels. 2. Construct shaded fuel breaks along the sides of roads on the Mill Creek Watershed perimeter. 3. Construct shaded fuel breaks along roads with homes in Mill Creek. Place high priority on China Canyon Lane, Neotoma Lane, and Emigh Lane. 4. Encourage hazard fuel reduction measures on private lots in the Mill Creek drainage with priority on the 115 homes rated as extreme or high in Washington and the China Canyon Lane, Neotoma Lane, Reynolds Drive and Emigh Lane in Oregon. 5. Maintain travel corridors and cut-banks to minimize available fuels in the form of weeds and brush.
Rationale	The Forest Service planned and implemented the Indian Ridge project in 2010 which hand thinned, piled and pile burned 96 acres along Indian ridge proper connecting the 65 road to the Tiger Saddle Small sale. The Tiger Saddle Small sale was implemented in 2010 also and treated 23 acres removing over-story trees to increase crown spacing and removed hazard trees along the 65 road for another 400 acres. In 2015 the suppression actions taken on the Grizzly Bear Complex built/maintained the fuel break along Forest Road 64. Building upon and increasing fuel breaks along the boundary of the watershed should remain a high priority. The Forest Service has initiated project planning to identify potential treatment areas on Federal lands. Potential treatments could include non-commercial thinning, landscape burning and pile burning. An environmental assessment will need to be completed.
Desired Condition	A perimeter around the watershed that has reduced fuels that controls fire behavior so that external threats of wildfire can be suppressed with minimal risk to firefighter safety. Continued monitoring and fuel reduction projects as needed to maintain a defensible perimeter.
How to implement and apply concepts	1. Acquire funding for proposed fuel breaks and fuel reduction projects. 2. Solicit contractors to perform work on the shaded fuel break. 3. Create an assessment for monitoring the accumulation of fuels within the shaded fuel break on an annual basis, with the intent to maintain the fuel break.
Timeline	Short Term (1-2 years) followed by ongoing projects.

Action Item	Improve access for firefighting equipment and evacuation
Mitigation #2	**Adequate road access for firefighters and evacuation.**
Priority	High

Process	1. Perform Assessments of current access throughout the Mill Creek WUIZ and prioritize roads through a cost-benefit analysis. 2. Seek funding for road widening and the creation of acceptable turnarounds.
	3. Solicit contractors for implementing proposed projects.
Rationale	While creation of a defensible space around a structure reduces the chance of a fire from burning up to a structure. Changing the building materials that are used on a home reduces the structures vulnerability to fire, should a fire occur.
Desired Condition	Structures and property that are more resilient to wildfire.
Timeline	Develop a proposed timeframe for the road access analysis and road construction projects following the adoption of the updated CWPP.

Action Item	Fire Districts experience gaps in communication with dispatch throughout the County.
Mitigation #3	**Improve communication network to cover gaps within the County.**
Priority	**High**
Process	1. Identify areas of gaps in the current communication systems. 2. Develop maps of the coverage gaps and assess how best to increase system efficiency and coverage. 3. Seek funding for improving communication coverages throughout the County and WUIZ.
Rationale	Communication is a vital part of any emergency situation. Wildfires are no exception, communication is a needed tool when dealing with wildfire.
Desired Condition	County wide communication ability, to keep firefighters in direct contact with dispatch.
Timeline	Ongoing (2+ years)

Action Item	Public involvement
Mitigation #4	**Education, Prevention, and Community Outreach**
Priority	High
Process	1. Provide workshops and written information about living in the WUI and with wildfires.
Rationale	Equip local citizens with the information needed to make educated decisions concerning wildfires and owning a home within the WUI.
Desired Condition	Citizens that are aware and proactive in mitigation activities that help reduce the vulnerability of structures to wildfires.
How to implement and apply concepts	1. Sponsor and promote Firewise Workshops. 2. Distribute written material such as the Living with Fire newsletter. 3. Conduct events to coordinate with the Oregon and Washington Wildfire Awareness Week each year (usually in May). Utilize the Media Toolkit developed by the Oregon State Fire Marshall's Office.

	4. Conduct house-to-house prevention visits and promote defensible space and other hazard reduction ideas. 5. Continue to implement Public Use Restrictions to address human-caused ignitions. 6. Promote safe debris burning activities. 7. Install and maintain an information kiosk.
Timeline	On-going

Action Item	Trail access for fire suppression
Mitigation #5	**Trail Access on National Forest Lands for Fire Suppression Purposes**
Priority	High
Process	1. Currently the Forest Service and City of Walla Walla work to maintain approximately 40 miles of trails annually for fire suppression purposes. Continued maintenance is critical for fire suppression efforts. 2. Maintain funding for City and Forest Service employees to maintain trails.
Rationale	Protect critical infrastructure in the event of a wildfire.
Desired Condition	Increased ability for fire suppression within the Mill Creek Watershed.
Timeline	On-going

Action Item	Filtration Plant for City Water
Mitigation #6	**Filtration Plant**
Priority	High
Process	1. The City of Walla Walla, has undertaken a $24 million water treatment plant upgrade. Construction will begin in 2017. The purpose of the upgrade is driven by a need to improve the disinfection capabilities. However, some filtration capability will also be added, this will increase the ability to filter turbid water in the event of a wildland fire in the watershed.
Rationale	Provide water to the citizens of Walla Walla.
Desired Condition	Provide consistent drinking water in a cost effective, efficient and timely manner even in the event of a loss of ambient water quality within the watershed due to fire or other natural causes.
Timeline	Long Term (3+ years)

Action Item	Continued agreements between the City of Walla Walla and the U.S. Forest Service for fire suppression in the Mill Creek Watershed.
Mitigation #7	**Wildfire Prevention Actions**
Priority	High

Process	1. Continue the existing cooperative agreements between the City of Walla Walla and the Forest Service. 2. Expand forest management and silviculture efforts in the watershed based upon pilot project results and best available science. 3. Maintain funding for Table Rock lookout. 4. Continue patrols by the Forest Service and City of Walla Walla for fire prevention and trespass purposes. 5. Keep entry permit requirements. 6. Maintain signage on the perimeter of the Municipal Watershed to prevent trespass. 7. Continue the current policy of aggressive suppression of all wildfires in and near the Municipal Watershed. 8. Emphasize fire prevention with visitor contacts for people using the Municipal Watershed under permitted purposes (elk hunting) and for recreation use along the perimeter.
Rationale	Fire suppression is a key to maintaining the water quality of the Mill Creek Watershed.
Desired Condition	Joint effort to maintain and improve the ability of the Forest Service to provide protection from wildfires within the watershed.
Timeline	On-going

Action Item	Tiger Web Fuels Reduction
Mitigation #8	**Fuels Reduction**
Priority	Moderate
Process	1. Determine the best method of reduction: Commercial Thinning, Non-Commercial Thinning, Landscape and pile burning. 2. Conduct the necessary NEPA process 3. Seek funding for proposed fuel reduction treatment. 4. Provide the staff and equipment necessary to safely execute the project.
Rationale	Prescriptions would begin the ecosystem restoration process and remove excess fuels that pose a risk to the watershed and the surrounding communities.
Desired Condition	A landscape scale restoration of the ecosystem that would return the fire behavior to the historical norms and improve the suppression opportunities.
Timeline	Short Term (1-2 years)

Action Item	Rural Fire Protection along Mill Creek Rd. that is outside the jurisdictional boundaries of Fire District #4 & #8.
Mitigation #9	**Establishment of a Rural Fire District**
Priority	High
Process	1. Assess the interest and availability of residences outside of District #4's service area for the creation of a rural fire district. 2. Seek funding to provide equipment, training, and a facility for a rural fire district.
Rationale	Protection of life and properties.
Desired Condition	Complete fire protection coverage throughout the Mill Creek Watershed.
Timeline	Long Term (3+ years)

Touchet WUIZ

Action Item	Fuel breaks within the large tracts of CRP lands.
Mitigation #1	**Fuel Breaks**
Priority	High
Process	1. Identify strategic areas within the CRP land that enables for the suppression of wildfires in a safe and controlled situation. 2. Work with land owners and NRCS to come up with a solution to the removal of land from CRP without the loss of revenue to the landowner. 3. Design system to input data accumulated for easy GIS access.
Rationale	Increase safety and fire suppression capabilities for firefighters.
Desired Condition	Fuel breaks that provide a safe and manageable position for fire suppression within the CRP lands, with no financial impact to the landowners for removal of lands from the program.
Timeline	Long Term (3+ years)

Action Item	Develop a working relationship with residents and Fire District within Oregon to reduce the potential for fire starts in Oregon that spread uncontrolled into Washington.
Mitigation #2	**Preparedness**
Priority	High
Process	1. Work with local residents and Oregon Fire Districts to produce a plan that enables the suppression of wildfires in Oregon's dead zones.
Rationale	Jurisdictional boundaries prevent Fire District #6 to provide suppression support to residents in Oregon that are currently without Fire District coverage. Fire starts that begin in Oregon but progress to Washington have in the past grown to an unmanageable state, when an initial attack could have prevented the fire spread.
Desired Condition	An agreement with local residents to enable District #6 the ability to suppress fires or give support to suppression activities that would otherwise endanger lives and property in Washington.
Timeline	On-going

Walla Walla WUIZ

Action Item	Work with land developers, private landowners, and governing officials to provide better access and connectivity of the roadway systems.
Mitigation #1	**Preparedness**
Priority	High
Process	1. Provide information and education to the public on the requirements for accessibility of emergency service vehicles.
Rationale	Road connectivity reduces response times and accessibility enables emergency responders to quickly provide services and evacuate the area when needed.
Desired Condition	Adequate road connectivity and accessibility for emergency services throughout the WUIZ.
Timeline	Short Term (1-2 years)

Action Item	Provide visible house markers for better response times
Mitigation #2	**Preparedness**
Priority	Low
Process	1. Work with homeowners and landowners to provide visible address markers throughout the WUIZ.
Rationale	Many rural residences are poorly identified, making locating the site of an emergency difficult.
Desired Condition	Easily identified address locations for rural residences to reduce response times.
Timeline	Short Term (1-2 years)

Waitsburg WUIZ

Action Item	Vegetation management along roadways to reduce fire starts from vehicles.
Mitigation #1	**Fuels Reduction**
Priority	High
Process	1. Secure funding for removal of vegetation along roadways, either through spraying herbicides or mechanical removal. 2. Work with Washington Department of Transportation to maintain roadways. 3. Solicit and hire contractors to perform fuels reduction when needed.
Rationale	Human caused fires are the leading cause of wildfires, removal of fuels along roadways reduces the likelihood of fire starting from vehicles.
Desired Condition	A buffer around roadways that minimize the likelihood of a fire starting from vehicles.
Timeline	On-going maintenance.

Action Item	Public involvement
Mitigation #2	**Education, Prevention, and Community Outreach**
Priority	High
Process	1. Provide workshops and written information about living in the WUI and with wildfires.
Rationale	Equip local citizens with the information needed to make educated decisions concerning wildfires and owning a home within the WUI.
Desired Condition	Citizens that are aware and proactive in mitigation activities that help reduce the vulnerability of structures to wildfires.
How to implement and apply concepts	1. Sponsor and promote Firewise Workshops. 2. Distribute written material such as the Living with Fire newsletter. 3. Conduct events to coordinate with the Oregon and Washington Wildfire Awareness Week each year (usually in May). Utilize the Media Toolkit developed by the Oregon State Fire Marshall's Office. 4. Conduct house-to-house prevention visits and promote defensible space and other hazard reduction ideas. 5. Continue to implement Public Use Restrictions to address human-caused ignitions. 6. Promote safe debris burning activities. 7. Install and maintain an information kiosk.
Timeline	On-going

Chapter 9

Mill Creek Watershed

Accomplishments and Challenges Accomplishments

In accordance with Cohesive Wildfire Strategy priorities mitigation efforts completed throughout the Mill Creek watershed and some of the surrounding areas have been focused on fuel breaks at the perimeter and ultimate protection of life, property and water quality. The goal of this plan update was to extend this Plan to the entire County of Walla Walla. In doing so it was decided to focus the planning efforts, needed resource requests and risk assessments on WUI Zones throughout the County as well as the Mill Creek watershed in its entirety regardless of portions of the watershed overlapping the Oregon State border. Following the adoption of the 2006 CWPP for the Mill Creek Watershed, the City of Walla Walla in cooperation with Oregon Department of Forestry (ODF) implemented a fuel reductions project on many of its parcels along Mill Creek and at the City of Walla Walla's intake facility. These projects focused on the reduction of surface fuels and removal of brush and fine fuels that can connect ground fire with canopy fire (ladder fuels). Additionally, these efforts worked in conjunction with the Department of Corrections work crew and Fire District #4 to aid more than 80 homeowners throughout their jurisdiction with creation of defensible space on their property. Figures 23 and 24 highlight the properties that were part of the defensible space program.

Figure 21 City of Walla Walla fuel reduction projects within their properties along Mill Creek and their intake facility

An active FIREWISE outreach program has been working throughout the County for a number of years, however NRCS funding for most recent grant is ending in July of 2017. Walla Walla County Emergency Management has been able to establish an emergency notification system for evacuation and emergency notification purposes via phone, text and email for anyone who signs up. This system and network is described in Chapter 3 in greater detail and funding for these efforts is through a Homeland Security grant award to County Emergency Management. There is a need throughout the County and the Mill Creek watershed to increase public outreach and education for the development of fire adapted communities. To continue to maintain and improve the contact system Emergency Management has developed, there is a need to seek diverse and a more-continuous funding source outside of the Homeland Security grant, which expires in 2017.

At the federal level within Walla Walla County the U.S. Forest Service was able to increase access to some locations within the surrounding areas of the Mill Creek watershed and complete road improvements on Forest Roads 64 and 65. These improvements provide emergency response vehicles and personnel greater access to the exterior of the Mill Creek watershed and can act as a fuel break in some areas.

Similarly, the Washington Department of Natural Resource (DNR) has been working to create shaded fuel breaks along the exterior of the Mill Creek watershed and is currently overseeing a new fuel break contract along the Western portion of the watershed boundary. Currently the
U.S. Forest Service has two proposed prescribed burns located around the exterior of the watershed: Tiger Webb and Table Springs. Both projects are planned to cover roughly 12,000 acres. The Tiger Webb prescribed burn would cover approximately 7,500 acres along the Southwestern corner of the watershed, and the Table Springs prescribed burn would cover 4,500 acres along the Eastern edge of the watershed.

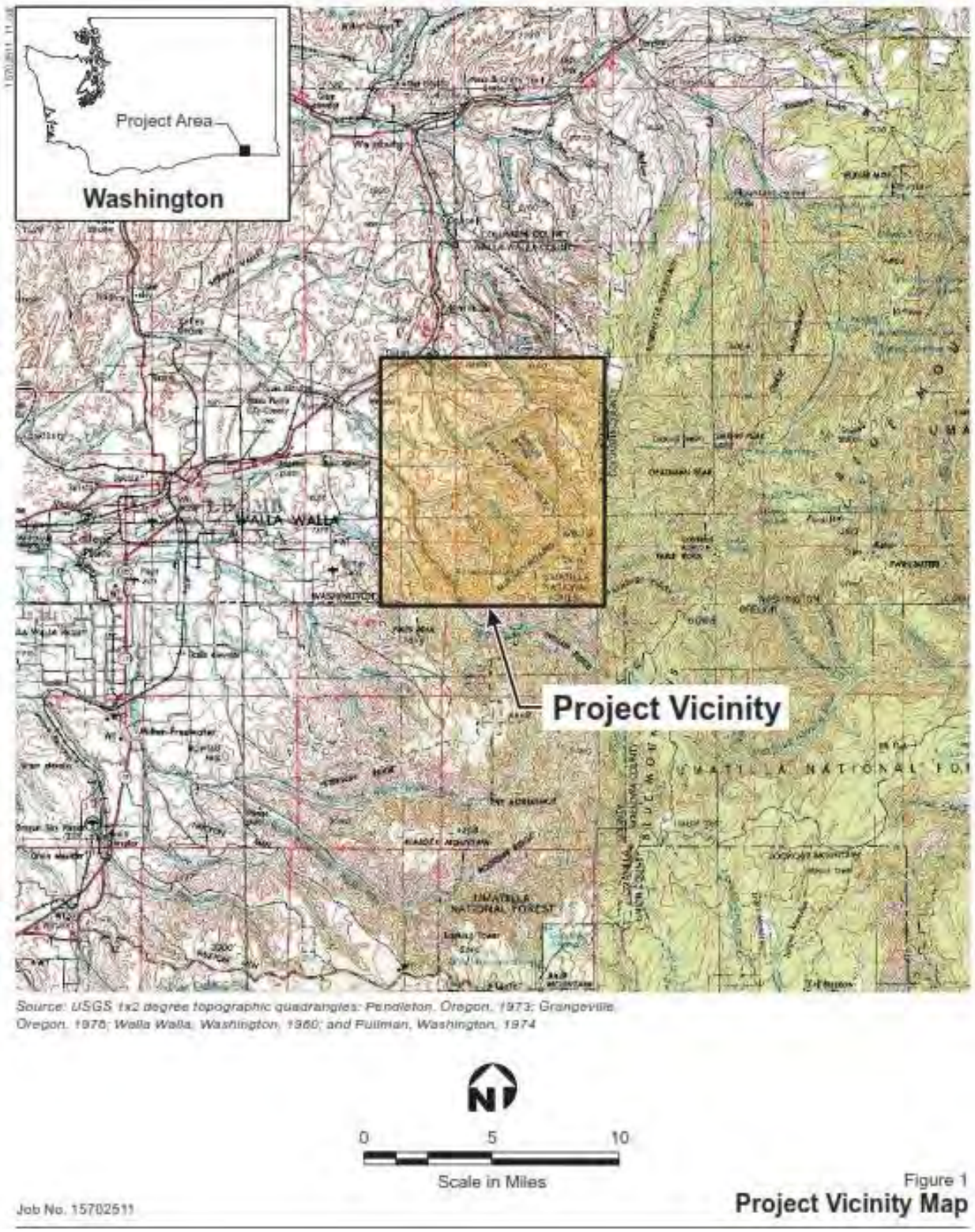


Figure 22 Project area for the Pre-Disaster Mitigation Grant. Defensible spaces were created within this area around residences

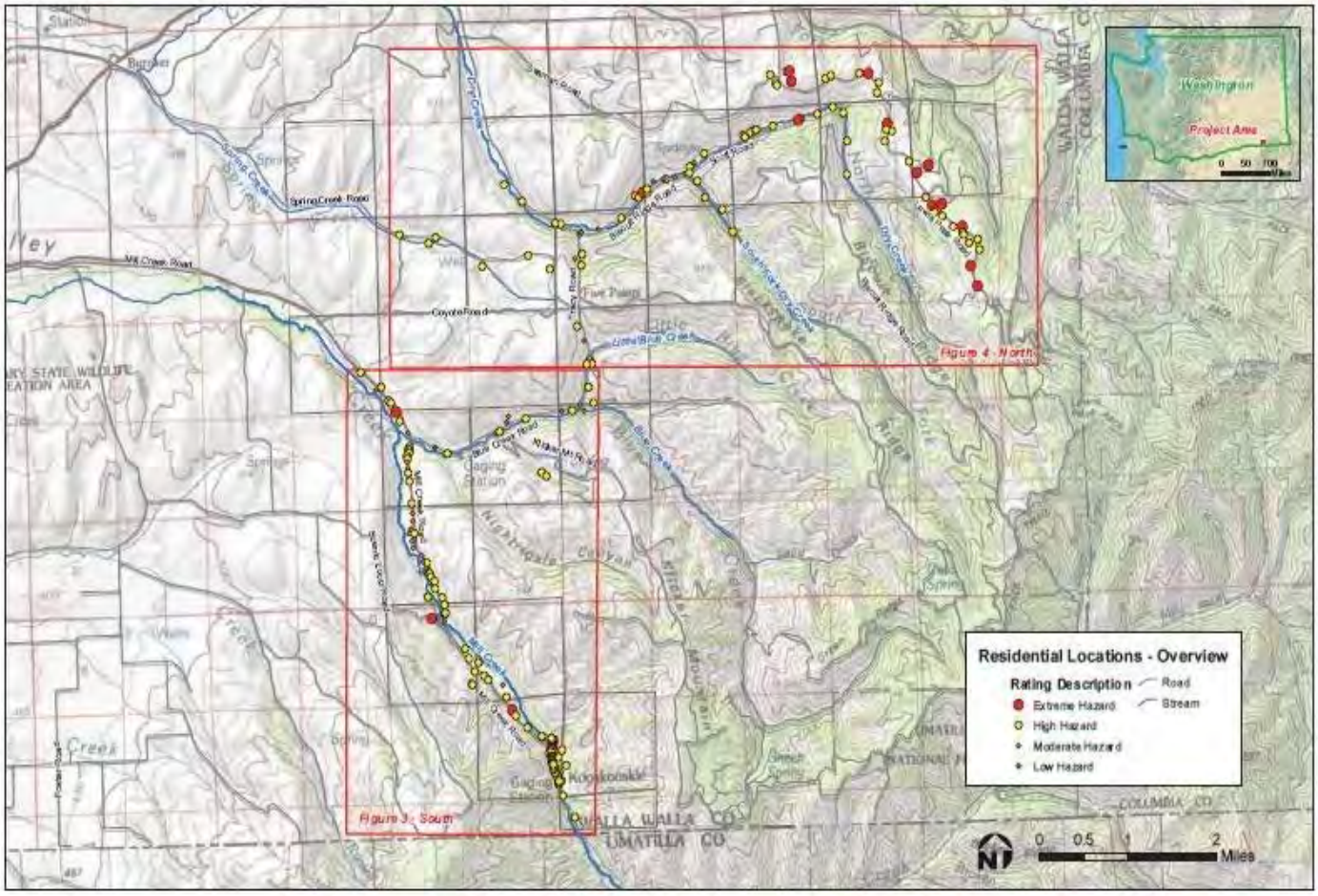


Figure 23 . Fire hazard ratings for residences within the project area.

Challenges

Project Planning, Pace and Scale

While the type of projects needed to create fire resilient landscapes and conditions that can accommodate a balance of human presence and natural ecologic function are needed on a landscape scale, the funding, personnel and social license to accomplish this will require extensive investments in time and education as well as communication. Each project works through an evaluation and cost benefit analysis by the committee followed by a lengthy funding, environmental assessment and implementation process. The pace at which these projects are approved are lagging compared to the acres of forests that burn every year. Additional challenges that were identified by agency officials, were sustained stakeholder participation throughout the process and responding to litigations (GAO-15-398, Forest Restoration).

Monitoring and Maintenance

Monitoring and proposed maintenance should be a line item for review by the steering committee during annual plan revision meetings for the CWPP. This will maintain the function of this CWPP in accordance with the Healthy Forest Restoration Act (HFRA) Section 102(g)(8). Additionally, section 102(g)(5), of HFRA requires that monitoring and maintenance of projects be a collaborative process that includes all interested stakeholders.

Whether monitoring efforts take on a more scientific approach by actually measuring the fuel loading changes, and environmental conditions post treatment, or an informal approach that simply monitors the project area from a proprietor approach, these efforts will provide necessary feedbacks into the feasibility of mitigation efforts. Long-term monitoring will provide a measure of cost-benefit analysis, in addition to providing the opportunity to maintain the initial cost of the project.

Appendix A

Agenda & Meeting Minutes

December 2016

Community Wildfire Protection Plan Steering Committee Meeting
Walla Walla County Fire District #4, Station 41
2251 S. Howard Street
Walla Walla, WA 99362

December 12, 2016

Present:
Bob Yancey, City of Walla Walla, Fire Department
Brett Thomas, U.S. Forest Service – Walla Walla District
Matt Hoehna – Oregon Department of Forestry – Pendleton
Mori Struve, City of Walla, Walla Public Works Department
Judith Johnson, Kooskooskie Commons
Liz Jessee, Walla Walla County Emergency Management Department
Rocky Eastman, Walla Walla County Fire District #4
Bob Carson – Whitman College
Brad Tucker – Northwest Management, Inc.
Bill Mathews – Northwest Management, Inc.
Alyssa Wells – EMD, EMS, Coroner

Minutes:
Call to Order

The meeting was called to order by Liz Jessee at 10:18 AM at Walla Walla County Fire District #4's Fire Station 41. Introductions were made. Liz gave an overview of the purpose of the meeting.

U.S. Forest Service

Brett Thompson gave a presentation on fire prevention that has been done in the area already. He highlighted the areas that were still in need of work and the costs involved.

Suggested showing the movie "Era of Megafires" that would educate the public on how we burn the forest. Alissa Cordner, Environmental Studies at Whitman College, has offered to coordinate a showing at Maxey Hall on campus. In the interest of having a good turnout Whitman will advertise in their newsletter. EMD will post to Facebook and possibly a letter to editor. City of

Walla Walla will post to their website.

Washington Department of Natural Resources

Washington Department of Natural Resources was unable to attend. On their behalf, Mori Struve reported that they are moving forward with plans for the fuel break project, which will cover an area 10 miles long and 200 ft. wide, along the watershed.

Northwest Management, Inc.

Brad Tucker gave a presentation highlighting plans they had done for other agencies.

January 2017

AGENDA

Community Wildfire Protection Plan (CWPP) Steering Committee Meeting

January 11, 2017, 10 AM – 12 PM

WALLA WALLA COUNTY FIRE DISTRICT 4,STATION 41

2251 S. HOWARD ST., WALLA WALLA

Opening Remarks and Introductions	Liz Jessee – Walla Walla County Emergency Management Dept.
Hosting 'Era of Megafires' Presentation Update	Liz Jessee – WWEM Bob Carson – Whitman College
CWPP Plan Revision: • Review Table of Contents • Mission, Goals and Objectives • Public Involvement Strategy • Fire District Summaries and Resource Lists • Map Presentation	Mori Struve – City of Walla Walla Brad Tucker – Northwest Management, Inc. Bill Mathews – Northwest Management, Inc.
Roundtable Discussion	All
Adjourn	

Minutes

Community Wildfire Protection Plan Steering Committee Meeting

Walla Walla County Fire District #4, Station 41

2251 S. Howard Street

Walla Walla, WA 99362

January 11, 2017

Present:

Brett Thomas, U.S. Forest Service – Walla Walla District

Mori Struve, City of Walla, Walla Public Works Department

Gayle Sanders, Rocky Mountain Elk Foundation

Matt Hoehna, Oregon Department of Forestry

Joseph Sciarrino, U.S. Forest Service
Larry Hector, Walla Walla County Fire District 4 & 6
Liz Jessee, Walla Walla County Emergency Management Department
Rocky Eastman, Walla Walla County Fire District #4
Bob Carson, Whitman College
Brad Tucker – Northwest Management, Inc.
Bill Mathews, Northwest Management, Inc.
Tom Schoenfelder, Washington State Department of Natural Resources
Renee Hadley, Walla Walla County Conservation District
Mark Corrao, Northwest Management, Inc.
Patrick Purcell, Walla Walla County Emergency Management Department

Minutes: Call to Order

The meeting was called to order by Liz Jessee at 10:15 AM at Walla Walla County Fire District #4's Fire Station 41. Introductions were made. Liz gave an overview of the purpose of the meeting.

Northwest Management Inc.

Representatives of Northwest Management Inc. gave a presentation on the work to date on the CWPP covering the following areas.

Table of Contents: Noted its flexibility and that it is directly modeled on the Union Country CWPP. A digital copy will be distributed for committee member consideration and input.

Mission, Goals and Objectives: Asked for input from the committee on any additions. Representative stated that examples of Union County Mission, Goals and Objectives would be provided to the committee for consideration. A committee member questioned the absence of input from utility and rail companies operating in the proposed project area. It was agreed that steps would be taken to try and incorporate their representation in future meetings.

Public Involvement Strategy: NWI representative opened a point of discussion on ways to involve the country Public Information Officer, (PIO) in helping to broaden the scope of public input into development of the CWPP. Chief Eastman suggested that the cities of Burbank and Waitsburg should be considered as possible locations for future public meetings. Further discussion among the committee consisted of possible methods of advertising and providing a public information table during the upcoming presentation, "Era of Mega Fires" scheduled for March 1st at Whitman University. It was also decided that Northwest Management Inc. will attend the next County "Chiefs" meeting in order to present/discuss the CWPP with all County fire department leadership. This meeting will take place at District 4 on 6 February at 5:00 PM.

CWPP Threat Maps: Using maps aligned with the proposed project borders Northwest Management Inc. representatives demonstrated the ability to display a variety of information

governing wildfire threat. There was discussion among the committee concerning the scope of displayed project borders and it was agreed to narrow the displayed map information back to Walla Walla county, the Mill Creek watershed and a narrow border along the periphery of the County. Representatives requested address location information which could also be displayed by map for consideration when determining threat areas within the County.

Roundtable Discussions:

- **Tentatively the next meeting will be held on February 22, 2017 @ 10:00am. Location will be Fire District 4, station 41.**
- **There was discussion about using NCRS assistance to help offset the cost of private landowner fire break construction.**
- **There was a suggestion bought to the attention of the committee about the possibility of mailing out survey to solicit input from the public.**
- **Liz Jessee asked if there were any further questions or comments and adjourned the meeting at 1130 AM.**

FEBRUARY 2017

Agenda

Community Wildfire Protection Plan (CWPP) Steering Committee Meeting

February 22, 2017, 10 AM – 12 PM

Opening Remarks and Introductions
Review Table of Contents
Fire District Summaries, Resource List and Fire History
Public Outreach Plan • Mega Fire Presentation
Chapter 1 – Introduction
Chapter 2 – Mission, Goals & Objectives
Chapter 4 – County Characteristics
Determination of County's Wildland Urban Interface (or methodology)
Roundtable
Establish Next Meeting Date
Adjourn

Minutes

Community Wildfire Protection Plan Steering Committee Meeting

Walla Walla County Fire District #4, Station 41

2251 S. Howard Street

Walla Walla, WA 99362

February 22, 2017

Present:

David Winter, College Place Fire Department

Devin Parvinen, Washington State Department of Natural Resources (DNR)

Rocky Eastman, Walla Walla County Fire District 4

Larry Hector, Walla Walla County Fire District 6

Renee Hadley, Walla Walla County Conservation District

Joseph Sciarrino, U.S. Forest Service (USFS) – Umatilla National Forest

Judith Johnson, Kooskooskie Commons

Lisa Caldwell, Columbia County Emergency Management
Anne Higgins, Columbia County Emergency Management
Bob Yancey, Walla Walla Fire Department
Bob Carson, Whitman College
Matt James, U.S. Forest Service
Bill Mathews, Northwest Management, Inc.
Mark Corrao, Northwest Management, Inc.
Matt Hoehna, Oregon Department of Forestry (ODF)

Minutes:

Call to Order

The meeting was called to order by Liz Jessee at 10:15 AM at Walla Walla County Fire District #4's Fire Station 41. Introductions were made.

Review Table of Contents & Chapters 1, 2 & 4

There were no comments about the Table of Contents. The information is there for Chapters 1 and 3 but fire district information is still needed. Chapter 4 is pretty solid.

It was noted that the draft CWPP, some of which was on today's agenda, was sent this morning and not everyone received a copy. Liz noted that there were issues sending the document, due to its size. Northwest Management, Inc.(NMI), agree to send the Table of Contents (TOC)/and draft chapters separately for review. They will send the TOC and Chapters, 1, 2 & 4 (today's portions for review) along with the draft chapters for the next steering committee chapters to list for forwarding. They will send it in Microsoft Word and asked that if anyone has any changes that they make the changes on the document with 'Track Changes' on.

Fire District Summaries

So far Rocky has District Summaries for Fire Districts 6 and 4. NMI stated that they need the summaries before they can proceed with Chapter 3 and it is an important part of the chapter. Summaries will feed into goals and objectives along. While we are still on schedule, it is very important that summaries be submitted. Rocky has a consolidated resource list for the fire districts from Emergency Management that he will forward to NMI.

NMI also needs summaries from DNR, ODF and USFS.

Public Outreach Plan

As discussed at the last meeting, organizations are encouraged to participate in the upcoming Era of Megafires presentation. Bob Carson will arrange for Whitman College to provide some tables

for use in the foyers. Emergency Management committed to bringing wildfire mitigation information to the presentation.

After some discussion, public outreach meetings to take place around the County, though not a requirement, is a good idea.

Determination of County's Wildland Urban Interface

A map was displayed and it was discussed what factors/methodology should be used to determine WUI areas. It was decided that home density, fire history/frequency, fuel type, and available resources were among the factors that would be used. The group gathered around the map and drew tentative WUI areas.

Next Meeting

The next meeting will be March 22, 2017 at WWFD 4 (same location).

Adjournment

The meeting adjourned at 11:35.

AGENDA

March 2017

Community Wildfire Protection Plan (CWPP) Steering Committee Meeting

March 22, 2017, 10 AM – 12 PM

WALLA WALLA COUNTY FIRE DISTRICT 4, STATION 41 2251 S. HOWARD ST., WALLA WALLA

Opening Remarks and Introductions

Confirmation of WUI Zones

Public Outreach
~Meetings
~Structure Group Discussion
~ Dates

Risk Assessment Process

Mitigation Assessment Chapter
~ Which priority projects to include

Previous Meeting
~ Chapter 2 – Mission, Goals and Objectives
~ Chapter 4 – County Characteristics

Introduction of New Draft Chapters
~ Chapter 3 Wildland Urban Interface Planning
~ Chapter 1 - Introduction

Roundtable

Establish Next Meeting Date

Adjourn

Minutes:

Community Wildfire Protection Plan Steering Committee Meeting

Walla Walla County Fire District #4, Station 41

2251 S. Howard Street

Walla Walla, WA 99362

March 22, 2017

Present:

Dave Reller, Columbia REA
Devin Parvinen, Washington State Department of Natural Resources (DNR)
Larry Hector, Walla Walla County Fire District 6
Bob Yancey, Walla Walla Fire Department
Matt James, U.S. Forest Service
Bill Mathews, Northwest Management, Inc.
Mark Corrao, Northwest Management, Inc.
Matt Hoehna, Oregon Department of Forestry (ODF)
Spencer Slyfield, Washington State Department of Natural Resources (DNR)
Mori Struve, City of Walla Walla Public Works
Patrick Purcell, Walla Walla County Emergency Management

Minutes:

Call to Order

The meeting was called to order by Mark Corrao at 10:10 AM at Walla Walla County Fire District #4's Fire Station 41. Introductions were made.

Confirmation of the Wildland Urban Interface (WUI)

Mark Corrao gave a short overview of the current depiction of the draft WUI zones being considered, and suggested that as soon as they were confirmed it would set the stage for other aspects of the study. Mark asked if there were any challenges to the current colors and boundaries currently being represented on the draft.

It was brought up in discussion that the southern area falling into the adjoining County be removed and a paragraph describing this area be placed into the study. The lack of risk delineation in this area raised questions as to why it was being maintained and might cause confusion to someone viewing the map. It was decided that the area would either be removed or grayed out and a written explanation of that area would be provided. There were no other objections and it was decided that they would consider the WUI areas confirmed and proceed.

Bill Mathews gave a short explanation of the layers currently on the WUI zone and Fire Risk map and contrasted what was currently displayed with information that would be added.

Dave Reller from Columbia REA asked if there would be any indication of utility lines or assets on the map. Bill explained that they had no current GIS information that they could overlay to

provide that information. Dave replied that he has information and will provide it for inclusion. Mori Struve asked about displaying lightning strike and historical fire information on the map. In discussion it was determined that it will be displayed and that additional data is available from

Walla Walla County Emergency Management Department the United States Forest Service and other sources which will further delineate lightning strikes and historical fire starts.

Public Outreach Plan

Mark Corrao communicated to the group that with four sections circulated and the WUI zones confirmed it was a good time to discuss public outreach so that community concerns can be addressed.

After discussion it was decided that 3 public meetings would be held, on April 17, 18, 19, at Mill Creek, Walla Walla and Touchet. These meetings will be held at fire stations located within the identified areas. Meetings will be held at 7 to 9 PM with the exception of Touchet which will be held from 6-8 PM. Mark added that he and Bill would also be available for site visits during that time should areas be free of snow and accessible. It was decided that it would be better to conduct the site visits at the end of May-first week of June in order to have more certain access to pertinent locations.

Mori Struve asked about the possibility of conducting a survey to elicit public comments prior to the meetings and expand the base from which public comments can be drawn. He will work with Mark to create questions which can be sent out with utility mailings.

Mark Corrao requested pictures of fire damage and mitigation projects from the committee members in order to be able to incorporate them into the presentations being created for the public meetings.

Mitigation Assessment Chapter

Bill Mathews said that they will be requesting Mitigation Assessments from local jurisdictions/agencies within WUI zones. They are more familiar with the challenges they face locally and with any mitigation required, planned or completed. These will be incorporated into the Mitigation Assessment Chapter in order to provide a voice to all parties. Further, this demonstrates an understanding of what risks exist and defines what is possible to mitigate under realistic budgetary constraints. This is also an educational piece directed at the public audience to manage expectations.

Introduction of New Draft Chapters

Chapter 1: Introduction

Chapter 2: Wildland Urban Interface Planning

Roundtable Discussion

No more discussion at this time

Next Meeting

The next meeting will be 26 April, 2017 at WWFD 4 (same location).

Adjournment

The meeting adjourned at 11:35.

AGENDA

April 2017

Community Wildfire Protection Plan (CWPP) Steering Committee Meeting

April 26, 2017, 10 AM – 12 PM

WALLA WALLA COUNTY FIRE DISTRICT 4, STATION 41 2251 S. HOWARD ST., WALLA WALLA

Opening Remarks and Introductions

CWPP Plan Discussion Points

1. **Wish-list of projects, resources, educational/training needs anywhere within the county, across all folks (private, city, county, state etc.)**
2. **Any information on projects/needs that were listed in the 2006 plan that DID get accomplished. We can transfer the list of projects that were identified from the old plan to the new one, to start that, but it would be good to have some examples of what has been accomplished.**
3. **If the steering committee could develop and provide us with their desired schedule for plan updates/revisiting for the future so we can include that in the last chapter.**
4. **Discuss where and how we would like to make folks aware of the document when it is ready for their review; who to field questions and gather responses to not duplicate efforts, but also to maximize the inclusion of feedback.**
5. **What type of language is, most helpful/least limiting, to the group for the "disclaimer" that will be included in the document identifying the non-regulatory nature of this plan. Is there something specific or is template language sufficient?**
6. **Other? Any other questions or concerns that the committee believes may need to be included.**

Public Outreach

Discuss feedback from April 17 – 19, 2017 Public Outreach meetings

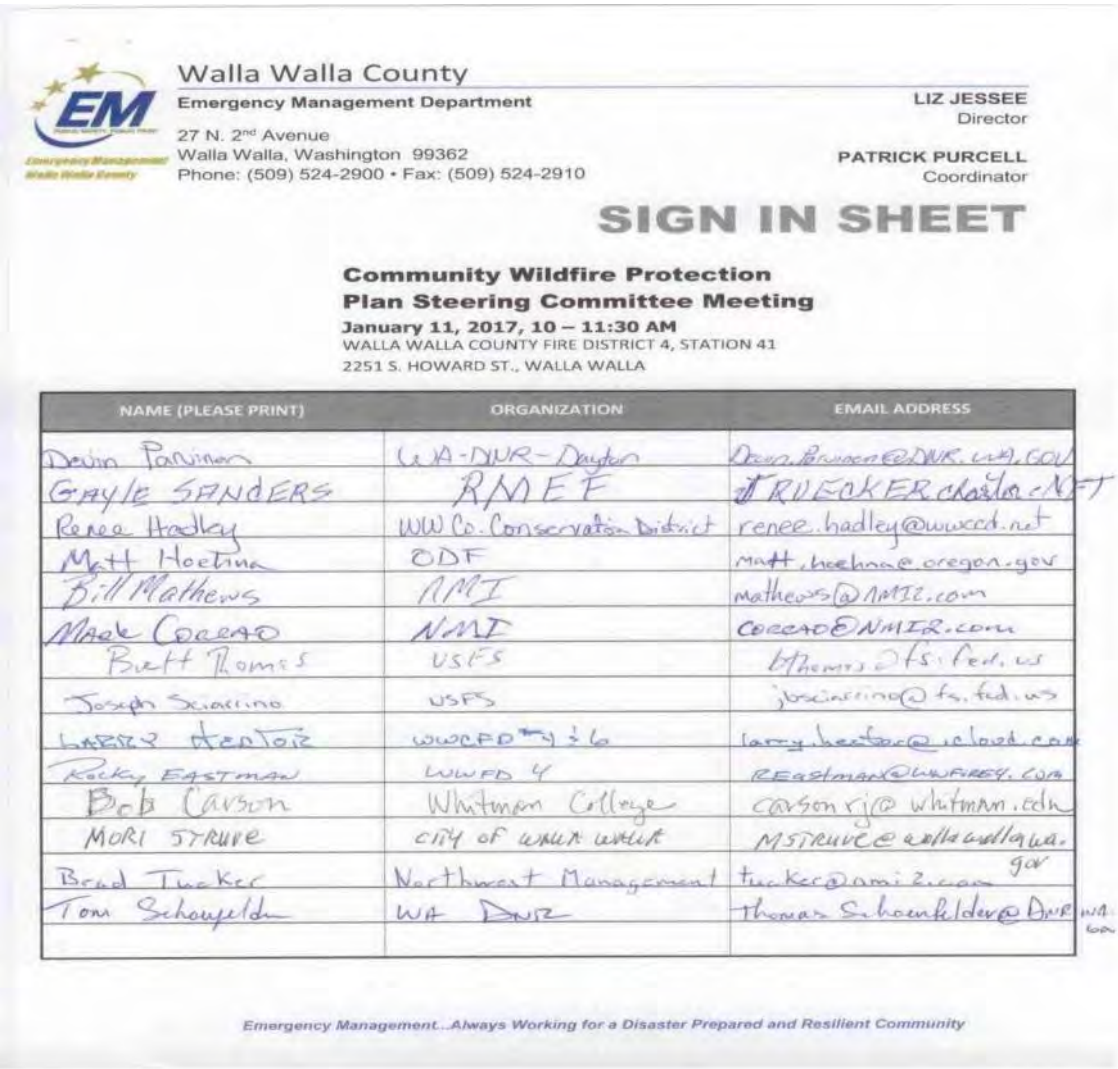
Roundtable

Establish Next Meeting Date Adjourn

Appendix B

Planning Committee and Public Outreach Meetings Sign in Sheets

Committee Meetings



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LIZ JESSEE
Director

PATRICK PURCELL
Coordinator

SIGN IN SHEET

Community Wildfire Protection Plan Steering Committee Meeting
January 11, 2017, 10 – 11:30 AM
WALLA WALLA COUNTY FIRE DISTRICT 4, STATION 41
2251 S. HOWARD ST., WALLA WALLA

NAME (PLEASE PRINT)	ORGANIZATION	EMAIL ADDRESS
Devin Parkinson	WA-DNR-Dayton	Devin.Parkinson@DNR.WA.GOV
GAYLE SANDERS	RMEF	GTRUECKER@RMEF.ORG
Renee Hadley	WW Co. Conservation District	renee.hadley@wwccd.net
Matt Hoetzel	ODF	matt.hoetzel@oregon.gov
Bill Mathews	NMI	mathews@NMIR.com
Mark Corcoran	NMI	corcoran@NMIR.com
Brett Thomas	USFS	bthomas02@fs.fed.us
Joseph Sciarrino	USFS	jsciarrino@fs.fed.us
Larry Hentzel	WWCFD #4 & 6	larry.hentzel@icloud.com
Rocky Eastman	WWFD 4	REastman@WWFIRE4.com
Bob Carson	Whitman College	carsonrj@whitman.edu
MORI STRUVE	CITY OF WALLA WALLA	MSTRUVE@wallawallawa.gov
Brad Tucker	Northwest Management	tucker@nmi2.com
Tom Schoenfelder	WA DNR	thomas.schoenfelder@DNR.WA.GOV

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LIZ JESSEE
Director

PATRICK PURCELL
Coordinator

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Community Wildfire Protection Plan Steering Committee Meeting

February 22, 2017, 10 – 11:30 AM
WALLA WALLA COUNTY FIRE DISTRICT 4, STATION 41
2251 S. HOWARD ST., WALLA WALLA

NAME (PLEASE PRINT)	ORGANIZATION	EMAIL ADDRESS
Liz Jessee	WWEMD	
DAVID WINTER	CPFD	
Devin Paviner	WA DNR	
Rocky EASTMAN	WWFD4	
LARRY HECTOR	WWFD6	
Renee M Hadley	WW Co. Conservation District	renee.hadley@cowcd.net
Joseph R Sciascia	USFS - UMATILLA N.F.	
Judith Johnson	Kooskooskie Commons	jsj@bmi.net
Lisa Caldwell	Columbia Co DEM	
Anne Higgins	" " "	
Bob Yancey	WWFD	
Bob Carson	Whitman College	
Matt JAMES	USFS	
Bill Mathews	NMI	
Mark Corrao	NMI	

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Director
PATRICK PURCELL
Coordinator

SIGN IN SHEET

Community Wildfire Protection Plan Steering Committee Meeting

February 22, 2017, 10 – 11:30 AM
WALLA WALLA COUNTY FIRE DISTRICT 4, STATION 41
2251 S. HOWARD ST., WALLA WALLA

NAME (PLEASE PRINT)	ORGANIZATION	EMAIL ADDRESS
Matt Hoehna	ODF	Matt.hoehna@oregon.gov

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Director

PATRICK PURCELL
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Community Wildfire Protection Plan Steering Committee Meeting

March 22, 2017, 10 – 11:30 AM
WALLA WALLA COUNTY FIRE DISTRICT 4, STATION 41
2251 S. HOWARD ST., WALLA WALLA

NAME (PLEASE PRINT)	ORGANIZATION	EMAIL ADDRESS
Mark Conrad	NMI	mconrad@NMI2.com
Bob Yuncey	WWFN	
Dave Reller	Columbia REA	dreller@columbiarea.coop
Bill Mathews	NMI	mathews@NMI2.com
MORI STRUVE	CITY OF W PW	MSTruve@wallawallawa.gov
LARRY HECTOR	D4 ÷6	larry.hector@icloud.com
MATT JAMES	USFS	mjames01@fs.fed.us
Devin Parviainen	WA DNR	Devin.Parviainen@DNR.WA.GOV
Spencer Slyfield	WA DNR	Spencer.Slyfield@DNR.WA.GOV
Matt Haehna	ODF	matt.haehna@oregon.gov
Patrick Purcell	WWEM	ppurcell@co.walla-walla.wa.us

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LIZ JESSEE
Director

PATRICK PURCELL
Coordinator

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Community Wildfire Protection Plan Steering Committee Meeting

April 26, 2017, 10 – 11:30 AM
WALLA WALLA COUNTY FIRE DISTRICT 4, STATION 41
2251 S. HOWARD ST., WALLA WALLA

NAME (PLEASE PRINT)	ORGANIZATION	EMAIL ADDRESS
Ricky EASTMAN	WWFD #4	
Judith Johnson	Kooskooskie Commons	
Joseph R. Sciarrino	USFS @ WWRD	
Bill Mathews	Mathews@nmi2.com	
[illegible]	DNR WA	
Renee Hadley	Walla Walla Co Conservation District	
Patrick Purcell	Walla Walla EMD Coordinator	
LIZ Jessee	Walla Wall EMD Director	
David Winters	College Place Fire Chief	
Matt James	USFS	
Mori Struvi	City of Walla Walla Public Works Operations Manager	

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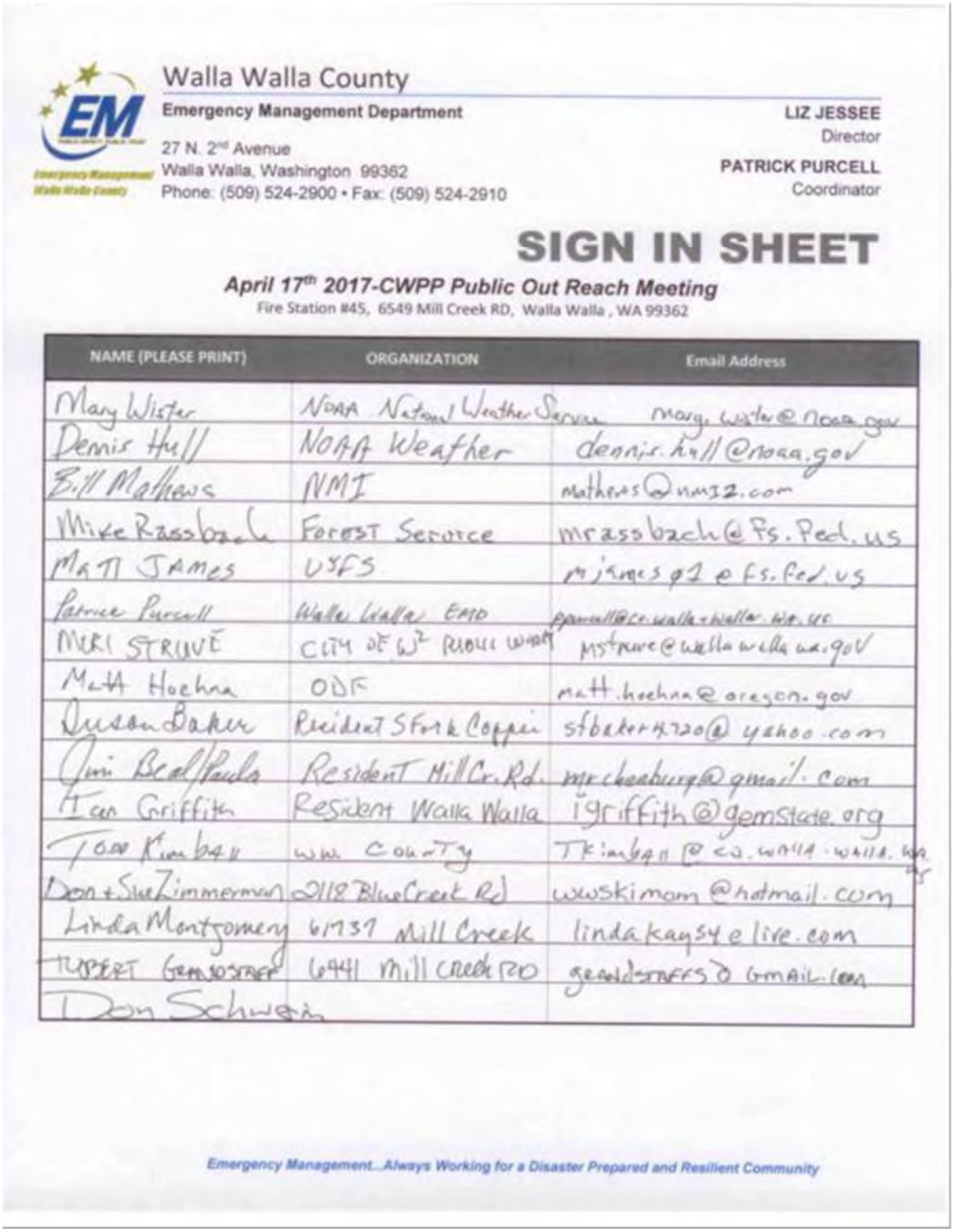

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Director
PATRICK PURCELL
Coordinator

SIGN IN SHEET

April 17th 2017-CWPP Public Out Reach Meeting
Fire Station #45, 6549 Mill Creek RD, Walla Walla , WA 99362

NAME (PLEASE PRINT)	ORGANIZATION	Email Address
Mary Wister	NOAA National Weather Service	mary.wister@noaa.gov
Dennis Hull	NOAA Weather	dennis.hull@noaa.gov
Bill Mathews	NMI	mathews@nmi2.com
Mike Rassbach	Forest Service	mrassbach@fs.fed.us
MATT JAMES	USFS	mjames01@fs.fed.us
Patrice Purcell	Walla Walla EMD	ppurcell@ce.walla-walla.wa.us
MERI STRIVE	CITY OF W² PUBLIC WORKS	MStrive@wallawalla.wa.gov
Matt Hoehna	ODF	matt.hoehna@oregon.gov
Duson Baker	Resident S Fork Coppei	sfbaker4720@yahoo.com
Jim Beal/Paula	Resident Mill Cr. Rd.	mrcheaburg@gmail.com
Ian Griffith	Resident Walla Walla	igriffith@gemstate.org
Tom Kimball	WW County	TKimball@co.walla-walla.wa.us
Don+Sue Zimmerman	2118 Blue Creek Rd	wwskimom@hotmail.com
Linda Montgomery	6737 Mill Creek	lindakay54@live.com
TUPPERT GEMSTATE	6441 Mill Creek RD	gemstatefs@GMAIL.COM
Don Schwein		

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Director
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Coordinator

SIGN IN SHEET

April 18th 2017-CWPP Public Out Reach Meeting

Fire Station #41, 2251 S. Howard St, Walla Walla , WA 99362

NAME (PLEASE PRINT)	ORGANIZATION	Email Address
Liz Jessee	WWCMD	LJessee@co.walla-walla.wa.us
Patrick Purcell	WWEMD	ppurcell@co.walla-walla-wa.us
Mori Struve	CITY OF WALLA WALLA	MStruve@wallawallawa.gov
Heidi Hoffer	WW. Co. A.R.E.S. Amateur Radio	KC7CCL@gmail.com
Craig Cooper	W.W. CO ARES.	ki7aan@gmail.com
FRED STEVENS	WW CO ARES	KF7UNF@GMAIL.com
KEITH CARLIN	WALLA WALLA COUNTY ARES	n7dcw@arrl.net
Matt James	USFS	mjames01@fs.fed.us
Mike Rassbach	USFS	mrassbach@fs.fed.us
Tracii Hickman	citizen City of WallaW	tmvw@charter.net
Joseph B. Scirrino	USFS	jbscirrino@fs.fed.us
Zig Napkora	USFS, citizen of WW	znapkora@fs.fed.us
Cindy McHie	Dept. of Corrections	cmchie@doc1.wa.gov
Carla Schettler	DOC/WSP	cyschettler@doc1.wa.gov
Michael Bates	DOC/WSPen.	michael.bates@doc.wa.gov
LISA NAYLOR	BlueMtn. RC&D Council	lisa.naylor@rocketmail.com
Joanna Yenney	Citizen of WW	bluekb1994@live.com
Bill Mathews	NMI	mathews@NMI2.com

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Coordinator

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April 18th 2017-CWPP Public Out Reach Meeting

Fire Station #41, 2251 S. Howard St, Walla Walla , WA 99362

NAME (PLEASE PRINT)	ORGANIZATION	Email Address
Mark Conrad	NMI	MConrad@nmi2.com

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Coordinator

SIGN IN SHEET

April 19th 2017-CWPP Public Out Reach Meeting

795 McKay Rd, Touchet , WA 99360

NAME (PLEASE PRINT)	ORGANIZATION	Email Address
MORI STRUVE	CITY OF WALLA WALLA PUBLIC WORKS	MSTruve@wallawallawa.gov
Lance Longmire	local resident	llongmire@wwps.org
Nathan Black	Local Resident	nathan.d.black@gmail.com
BRIAN JONES	WWCFPD #4	brianj@pocketinet.com
Liz Jessee	WWCO EMD	
Rusty Waite	WWCFD #6	rm.waite@hotmail.com
LARRY HECTOR	WWCFD #6	tfd6@owinp.net
GENE CURCIO	LAND OWNER/BLUE CREEK	~~gdb~~ gdbuzzard@gmail.com (YOU HAVE THIS IN SYSTEM)
Wyatt Borgens	Land Owner WWCFD #6	Wborgens@columbia.net
Lauri R Lahtinen	Land owner	Jacklahtinen@charter.net
Cathy Schaeffer	Rep. Cathy McMorris Rodgers	cathy.schaeffer@mail.house.gov

Appendix B

Forms

Mitigation Action Progress Report Form

Progress Report Period	*From date:*	*To date:*
Action/Project Title		
Responsible Agency		
Contact Name		
Contact Phone/Email		
Project Status	❑ *Project completed* ❑ *Project canceled* ❑ *Project on schedule* *Anticipated completion date:* _____ ❑ *Project delayed* *Explain* _____	

Summary of Project Progress for this Report Period

1. What was accomplished for this project during this reporting period?

_____

_____

2. What obstacles, problems, or delays did the project encounter?

_____

_____

3. If uncompleted, is the project still relevant? Should the project be changed or revised?

_____

_____

4. Other comments

_____

_____

Plan Update Evaluation Worksheet

Plan Section	Considerations	Explanation
Planning Process	Should new jurisdictions and/or districts be invited to participate in future plan updates?	
	Have any internal or external agencies been invaluable to the mitigation strategy?	
	Can any procedures (e.g., meeting announcements, plan updates) be done differently or more efficiently?	
	Has the Planning Team undertaken any public outreach activities?	
	How can public participation be improved?	
	Have there been any changes in public support and/or decision- maker priorities related to hazard mitigation?	
Capability Assessment	Have jurisdictions adopted new policies, plans, regulations, or reports that could be incorporated into this plan?	
	Are there different or additional administrative, human, technical, and financial resources available for mitigation planning?	
	Are there different or new education and outreach programs and resources available for mitigation activities?	
	Has NFIP participation changed in the participating jurisdictions?	
Risk Assessment	Has a natural and/or technical or human-caused disaster occurred?	
	Should the list of hazards addressed in the plan be modified?	

Plan Section	Considerations	Explanation
	Are there new data sources and/or additional maps and studies available? If so, what are they and what have they revealed? Should the information be incorporated into future plan updates?	
	Do any new critical facilities or infrastructure need to be added to the asset lists?	
	Have any changes in development trends occurred that could create additional risks?	
	Are there repetitive losses and/or severe repetitive losses to document?	
Mitigation Strategy	Is the mitigation strategy being implemented as anticipated? Were the cost and timeline estimates accurate?	
	Should new mitigation actions be added to the Action Plan? Should existing mitigation actions be revised or eliminated from the plan?	
	Are there new obstacles that were not anticipated in the plan that will need to be considered in the next plan update?	
	Are there new funding sources to consider?	
	Have elements of the plan been incorporated into other planning mechanisms?	
Plan Maintenance Procedures	Was the plan monitored and evaluated as anticipated?	
	What are needed improvements to the procedures?	

This plan was developed by Northwest Management, Inc. under contract with the City of Walla Walla, with funding provided by Oregon Department of Forestry, Walla Walla County Emergency Management, The City of Walla Walla.

Citation of this work:

Mathews, Bill and Corrao, Mark *Lead Authors.* 2017 Mill Creek and Walla Walla County, Washington Community Wildfire Protection Plan Update. Northwest Management, Inc., Moscow, Idaho.

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[Last Page of Document]