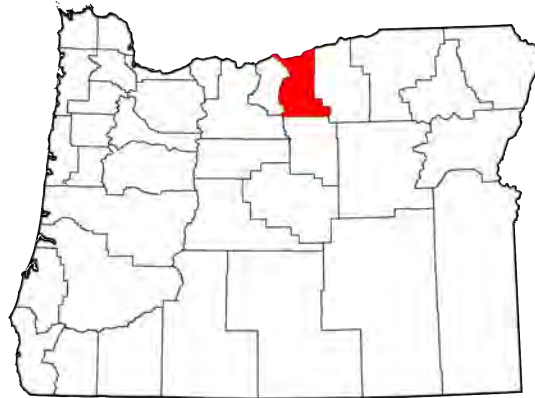


Gilliam County

MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN

Serving Gilliam County, The City of Arlington, The City of
Condon and The City of Lonerock



FEMA

Effective August 22, 2024 through August 21, 2029

Report for:

Gilliam County
City of Arlington
City of Condon
City of Lonerock

Prepared by:

Fair Winds Consulting, LLC

August 2024

The *2024 Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan* is a living document that will be reviewed and updated periodically. Comments, suggestions, corrections, and additions are enthusiastically encouraged to be submitted from all interested parties.

For further information and to provide comments, contact:

Chris Fitzsimmons, Emergency Manager
Gilliam County
211 South Oregon Street, Oregon 97823
Telephone: 541-351-9530
Email: chris.fitz@co.gilliam.or.us

Special Thanks & Acknowledgements

Gilliam County developed this Multi-Jurisdictional Natural Hazards Mitigation Plan through a grant funded by the Federal Emergency Management Agency's Hazard Mitigation Grant Program. FEMA awarded the grant to the State of Oregon, and Gilliam County received a sub-grant through the State to support the update of their natural hazards mitigation plan.

Gilliam County NHMP Steering Committee:

Convener: Chris Fitzsimmons, Coordinator, Gilliam County Emergency Management

Michelle Colby, Planner, Gilliam County Planning Department

Gary Bettencourt, Sheriff, Gilliam County Sheriff's Office

Casey Zellars, Coordinator, Gilliam County Fire Services

Shanna Gronquist, City of Arlington Public Works

Gibb Wilkins, Assistant, City of Condon Public Works

Dewey Kennedy, Road Master, Gilliam County Road Department

Stan Forrest, Mayor, City of Lonerock

Andrew Beebe, Lonerock City Council

Chet Wilkins, Assessor, Gilliam County Assessor's Office

Casey Zellars, Gilliam County Fire Services Operations Chief

Dailene Wilson, Gilliam County Public Health

Herb Winters, District Manager, Soil and Water Conservation District

Norie Wright, Office Manager, Soil and Water Conservation District

Greg Smith, Chief, South Gilliam County Rural Fire Protection District

Joe Claughton, Chief, North Gilliam County Rural Fire Protection District

Jordan Maley, Extension Agent, Oregon State University

Joely Jaeger, Coordinator, Gilliam County Emergency Management

Mike Renault, Regional Mobilization Coordinator, Oregon State Fire Marshal

Simone Cordery-Cotter, Fire Risk Reduction Specialist, Oregon State Fire Marshal

Rob Fore, Fuels Specialist, Bureau of Land Management

Sheldon Rhoden, Fire Management Specialist/Fire Trespass Coordinator, Bureau of Land Management

Richard Fletcher, Rangeland Fire Protection, Oregon Department of Forestry

City of Arlington NHMP Steering Committee:

Convener: Kari Hayter, City Recorder, City of Arlington

Chris Fitzsimmons, Coordinator, Gilliam County Emergency Management

Shanna Gronquist, City of Arlington Public Works

City of Condon NHMP Steering Committee:

Convener: Gibb Wilkins, Assistant, City of Condon Public Works

Chris Fitzsimmons, Coordinator, Gilliam County Emergency Management

Kathyrn Greiner, City Administrator, City of Condon

City of Lonerock NHMP Steering Committee:

Convener: Stan Forrest, Mayor, City of Lonerock

Andrew Beebe, City Council, City of Lonerock

Tammy Forrest, Citizen, City of Lonerock

Donna Lopiparo, Citizen, City of Lonerock

Chris Fitzsimmons, Coordinator, Gilliam County

Project Managers:

Chris Fitzsimmons, Coordinator, Gilliam County Emergency Management

Joely Jaeger, Gilliam County Emergency Management

Cori Mikkalo, Fair Winds Consulting, LLC

Geographic Information Systems (GIS) Maps:

Map developed by the following entities contributed to the plan update process. The contributions from these departments were essential in illustrating the extent and potential losses associated with the natural hazards affecting the community

Oregon Department of Geology and Mineral Industries

Federal Emergency Management Agency

U.S. Geological Survey

About the Institute for Policy Research and Engagement

The Institute for Policy Research and Engagement (IPRE), a research center affiliated with the School of Planning, Public Policy, and Management at the University of Oregon, is an interdisciplinary organization that assists Oregon communities by providing planning and technical assistance to help solve local issues and improve the quality of life for Oregon residents. The role of the IPRE is to link the skills, expertise, and innovation of higher education with the transportation, economic development, and environmental needs of communities and regions in the State of Oregon, thereby providing service to Oregon and learning opportunities to the students involved.

About the Oregon Partnership for Disaster Resilience

The Oregon Partnership for Disaster Resilience (OPDR) is a coalition of public, private, and professional organizations working collectively toward the mission of creating a disaster-resilient and sustainable state. Developed and coordinated by the Institute for Policy Research and Engagement at the University of Oregon, the OPDR employs a service-learning model to increase community capacity and enhance disaster safety and resilience statewide.

Plan Template Disclaimer

This Natural Hazards Mitigation Plan update is based in part on a plan template developed by the University of Oregon's Institute for Policy Research and Engagement (IPRE) - Oregon Partnership for Disaster Resilience (OPDR) and used in the 2013 and 2018 Gilliam County NHMP. OPDR provided copies of the plan templates to communities for use in developing or updating their natural hazards mitigation plans at that time. OPDR hereby authorizes the use of all content and language provided to Gilliam County in the plan template. The template is structured to address the requirements contained in 44 CFR 201.6; where language is applicable to communities throughout Oregon, OPDR encourages the use of standardized language. However, emphasis is placed on identifying and describing the unique attributes of the counties and cities for each plan. The basic format of the 2013 NHMP was retained for the 2018 update and for this 2024 NHMP update.

Gilliam County

Multi-jurisdictional Natural Hazards Mitigation Plan

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FEMA

August 22, 2024

Cris Patnode, County Judge
Gilliam County Court
221 S. Oregon Street
Condon, Oregon 97823

Reference: Approval of the Gilliam County Multi-jurisdictional Hazards Mitigation Plan

Honorable Cris Patnode:

In accordance with applicable¹ laws, regulations, and policy, the United States Department of Homeland Security's Federal Emergency Management Agency (FEMA) Region 10 has approved the Gilliam County multi-jurisdictional hazards mitigation plan for the following jurisdictions:

Gilliam County	City of Arlington	City of Lonerock
City of Condon		

The approval period for this plan is from August 22, 2024 through August 21, 2029.

An approved hazard mitigation plan is one of the conditions for applying for and receiving FEMA mitigation grants from the following programs:

- Hazard Mitigation Grant Program (HMGP)
- Hazard Mitigation Grant Program Post-Fire (HMGP-PF)
- Building Resilient Infrastructure and Communities (BRIC)
- Flood Mitigation Assistance (FMA)
- High Hazard Potential Dams Grants Program (HHPD)

Based on FEMA's review, the plan did not include all dam risk. Thus, the participating jurisdictions are not eligible for assistance from the HHPD Grant Program. If any participating jurisdictions with HHPDs are interested in this assistance, they should contact the FEMA Region 10 Hazard Mitigation Planning Team at FEMA-R10-MT_Planning@fema.dhs.gov, to learn more about how to include all dam risks in the plan.

Having an approved hazard mitigation plan does not mean that mitigation grant funding will be awarded. Specific application and eligibility requirements for the programs listed above can be found in each FEMA grant program's respective policies and annual Notice of Funding Opportunities, as applicable.

¹ Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and National Dam Safety Program Act, as amended; Title 44 Code of Federal Regulations (CFR) Part 201, Mitigation Planning; and Local Mitigation Planning Policy Guide (FP-206-21-0002).

County Judge Patnode
August 22, 2024
Page 2

To avoid a lapsed plan, the next plan update must be approved before the end of the approval period, including adoption by the participating jurisdiction(s). Before the end of the approval period, please allow sufficient time to secure funding for the update, including the review and approval process. Please include time for any revisions, if needed, and for participating jurisdictions to formally adopt the plan after the review, if not adopted prior to submission. This will enable each jurisdiction to remain eligible to apply for and receive funding from FEMA's mitigation grant programs with a hazard mitigation plan requirement. Local governments, including special districts, with a plan status of "Approvable Pending Adoption" are not eligible for FEMA's mitigation grant programs with a hazard mitigation plan requirement.

If you have questions regarding your plan's approval or FEMA's mitigation program, please contact Jason Gately, Mitigation Program Representative, Oregon Department of Emergency Management at 971-719-1069 or jason.a.gately@oem.oregon.gov, who coordinates these efforts for local entities.

Sincerely,

WENDY L SHAW

Digitally signed by WENDY L
SHAW

Date: 2024.08.26 08:34:17 -07'00'

Wendy Shaw, P.E.
Risk Analysis Branch Chief
Mitigation Division

Enclosures

cc: Stephen Richardson, Oregon Department of Emergency Management
Jason Gately, Oregon Department of Emergency Management
Joseph Murray, Oregon Department of Emergency Management

JF:JG:WS

Appendix A: Local Mitigation Plan Review Tool

Cover Page

The Local Mitigation Plan Review Tool (PRT) 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 local governments, including special districts.

1. The Multi-Jurisdictional Summary Sheet is a worksheet that is used to document how each jurisdiction met the requirements of the plan elements (Planning Process; Risk Assessment; Mitigation Strategy; Plan Maintenance; Plan Update; and Plan Adoption).
2. The Plan Review Checklist summarizes FEMA’s evaluation of whether the plan has addressed all requirements.

For greater clarification of the elements in the Plan Review Checklist, please see Section 4 of this guide. Definitions of the terms and phrases used in the PRT can be found in Appendix E of this guide.

Plan Information	
Jurisdiction(s)	Gilliam County, City of Arlington, City of Condon, City of Lonerock
Title of Plan	Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan
New Plan or Update	Update
Single- or Multi-Jurisdiction	Multi-Jurisdiction
Date of Plan	January 2024
Local Point of Contact	
Title	Chris Fitzsimmons
Agency	Gilliam County Emergency Management
Address	PO Box 685 Condon, Oregon 97823
Phone Number	541-351-9530
Email	chris.fitz@co.gilliam.or.us

Additional Point of Contact	
Title	Joely Jaeger
Agency	Gilliam County Emergency Management
Address	PO Box 685 Condon, Oregon 97823
Phone Number	541-351-9530
Email	joely.jaeger@co.gilliam.or.us

Review Information	
State Review	
State Reviewer(s) and Title	Jason Gately, Mitigation Planner
State Review Date	04/12/2024
FEMA Review	
FEMA Reviewer(s) and Title	Joshewa Fulton, Hazard Mitigation Planner
Date Received in FEMA Region	5/20/2024
Plan Not Approved	
Plan Approvable Pending Adoption	6/24/2024
Plan Approved	8/22/2024

Multi-Jurisdictional Summary Sheet

#	Jurisdiction Name	Requirements Met (Y/N)							
		A. Planning Process	B. Risk Assessment	C. Mitigation Strategy	D. Plan Maintenance	E. Plan Update	F. Plan Adoption	G. HHPD Requirements	G. State Requirements
1	Gilliam County	Y	Y	Y	Y	Y	Y	N/A	
2	Arlington	Y	Y	Y	Y	Y	Y	N/A	
3	Condon	Y	Y	Y	Y	Y	Y	N/A	
4	Lonerock	Y	Y	Y	Y	Y	Y	N/A	

Plan Review Checklist

The Plan Review Checklist is completed by FEMA. States and local governments are encouraged, but not required, to use the PRT as a checklist to ensure all requirements have been met prior to submitting the plan for review and approval. 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.” FEMA completes the “required revisions” summary at the bottom of each element to clearly explain the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is “not met.” Sub-elements in each summary should be referenced using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each element and sub-element are described in detail in Section 4: Local Plan Requirements of this guide.

Plan updates must include information from the current planning process.

If some elements of the plan do not require an update, due to minimal or no changes between updates, the plan must document the reasons for that.

Multi-jurisdictional elements must cover information unique to all participating jurisdictions.

Element A: Planning Process

Element A Requirements	Location in Plan (section and/or page number)	Met / Not Met
A1. Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))		
A1-a. Does the plan document how the plan was prepared, including the schedule or time frame and activities that made up the plan’s development, as well as who was involved?	3,4, i, ii, 2, 1-3	MET
A1-b. Does the plan list the jurisdiction(s) participating in the plan that seek approval, and describe how they participated in the planning process?	i, ii, 2, Appendix B	MET
A2. Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process? (Requirement 44 CFR § 201.6(b)(2))		
A2-a. Does the plan identify all stakeholders involved or given an opportunity to be involved in the planning process, and how each stakeholder was presented with this opportunity?	3, 4, ii, B-17, B-24, B-30, B-35, B-42	MET

Element A Requirements	Location in Plan (section and/or page number)	Met / Not Met
A3. Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval? (Requirement 44 CFR § 201.6(b)(1))		
A3-a. Does the plan document how the public was given the opportunity to be involved in the planning process and how their feedback was included in the plan?	3-5, 1-4, Appendix B	MET
A4. Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement 44 CFR § 201.6(b)(3))		
A4-a. Does the plan document what existing plans, studies, reports and technical information were reviewed for the development of the plan, as well as how they were incorporated into the document?	3-5, C-44, C-45, C-46, C-47, C-48	MET
Element A Required Revisions		
Required Revision:		

Element B: Risk Assessment

Element B Requirements	Location in Plan (section and/or page number)	Met / Not Met
B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on previous occurrences of hazard events and on the probability of future hazard events? (Requirement 44 CFR § 201.6(c)(2)(i))		
B1-a. Does the plan describe all natural hazards that can affect the jurisdiction(s) in the planning area, and does it provide the rationale if omitting any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area?	2-2, 2-6, 2-8, 2-15, 2-19, 2-21, 2-26, 2-28, 2-31	MET
B1-b. Does the plan include information on the location of each identified hazard?	2-6, 2-8, 2-16, 2-19, 2-22, 2-26, 2-29, 2-30, 2-32	MET
B1-c. Does the plan describe the extent for each identified hazard?	2-6, 2-8, 2-16, 2-22, 2-26, 2-27, 2-29, 2-30, 2-36, 2-37, 2-38, 2-39, 2-40	MET
B1-d. Does the plan include the history of previous hazard events for each identified hazard?	2-3, 2-4, 2-6, 2-13, 2-17, 2-20, 2-24, 2-27, 2-29, 2-31, 2-32	MET

Element B Requirements	Location in Plan (section and/or page number)	Met / Not Met
B1-e. Does the plan include the probability of future events for each identified hazard? Does the plan describe the effects of future conditions, including climate change (e.g., long-term weather patterns, average temperature and sea levels), on the type, location and range of anticipated intensities of identified hazards?	2-4, 2-8, 2-13, 2-18, 2-21, 2-25, 2-28, 2-31, 2-33, 2-34	MET
B1-f. For participating jurisdictions in a multi-jurisdictional plan, does the plan describe any hazards that are unique to and/or vary from those affecting the overall planning area?	2-9, AA-13, AA-14, AA-15, AA-16, AA-17, AA-18, CA-13, CA-14, CA-15, CA-16, CA-17, CA-18, CA-19, CA-20, LA-10, LA-11, LA-12, LA-13, LA-14, LA-15	MET
B2. Does the plan include a summary of the jurisdiction’s vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP-insured structures that have been repetitively damaged by floods? (Requirement 44 CFR § 201.6(c)(2)(ii))		
B2-a. Does the plan provide an overall summary of each jurisdiction’s vulnerability to the identified hazards?	AA-7, AA-8, AA-9, CA-10, CA-11, CA-12, LA-8, LA-9, LA-10	MET
B2-b. For each participating jurisdiction, does the plan describe the potential impacts of each of the identified hazards on each participating jurisdiction?	AA-13, AA-14, AA-15, AA-16, AA-17, AA-18, CA-13, CA-14, CA-15, CA-16, CA-17, CA-18, CA-19, CA-20, LA-10, LA-11, LA-12, LA-13, LA-14, LA-15	MET
B2-c. Does the plan address NFIP-insured structures within each jurisdiction that have been repetitively damaged by floods?	2-18, 2-19, AA15, AA-16, CA-16, CA-17, LA-12	MET
Element B Required Revisions		
Required Revision:		

Element C: Mitigation Strategy

Element C Requirements	Location in Plan (section and/or page number)	Met / Not Met
C1. Does the plan document each participant's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement 44 CFR § 201.6(c)(3))		
C1-a. Does the plan describe how the existing capabilities of each participant are available to support the mitigation strategy? Does this include a discussion of the existing building codes and land use and development ordinances or regulations?	3-8, C-45, C-46, C-47, C-48, AA-4, CA-4, LA-4	MET
C1-b. Does the plan describe each participant's ability to expand and improve the identified capabilities to achieve mitigation?	C-45, C-46, C-47, C-48, AA-4, CA-4, LA-4	MET
C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))		
C2-a. Does the plan contain a narrative description or a table/list of their participation activities?	2-19, 2-18, AA-15, AA-16, CA-16, CA-17, LA-12	MET
C3. Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement 44 CFR § 201.6(c)(3)(i))		
C3-a. Does the plan include goals to reduce the risk from the hazards identified in the plan?	3-1	MET
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 44 CFR § 201.6(c)(3)(ii))		
C4-a. Does the plan include an analysis of a comprehensive range of actions/projects that each jurisdiction considered to reduce the impacts of hazards identified in the risk assessment?	3-9, 3-10, 3-11, 3-12, 3-13, 3-14, Appendix A; A-1 thru A-44	MET
C4-b. Does the plan include one or more action(s) per jurisdiction for each of the hazards as identified within the plan's risk assessment?	3-9, 3-10, 3-11, 3-12, 3-13, 3-14, Appendix A; A-1 thru A-44	MET
C5. Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction? (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))		
C5-a. Does the plan describe the criteria used for prioritizing actions?	3-5, 4-3, 4-4, 4-5	MET

Element C Requirements	Location in Plan (section and/or page number)	Met / Not Met
C5-b. Does the plan provide the position, office, department or agency responsible for implementing/administrating the identified mitigation actions, as well as potential funding sources and expected time frame?	3-9, 3-10, 3-11, 3-12, 3-13, 3-14, Appendix A; A-1 thru A-44, AA-3, CA-3, LA-3	MET
Element C Required Revisions		
Required Revision:		

Element D: Plan Maintenance

Element D Requirements	Location in Plan (section and/or page number)	Met / Not Met
D1. Is there discussion of how each community will continue public participation in the plan maintenance process? (Requirement 44 CFR § 201.6(c)(4)(iii))		
D1-a. Does the plan describe how communities will continue to seek future public participation after the plan has been approved?	4-6, 4-7, AA-5, CA-6, LA-4	MET
D2. 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 44 CFR § 201.6(c)(4)(i))		
D2-a. Does the plan describe the process that will be followed to track the progress/status of the mitigation actions identified within the Mitigation Strategy, along with when this process will occur and who will be responsible for the process?	4-6	MET
D2-b. Does the plan describe the process that will be followed to evaluate the plan for effectiveness? This process must identify the criteria that will be used to evaluate the information in the plan, along with when this process will occur and who will be responsible.	4-1, 4-2, 4-6	MET
D2-c. Does the plan describe the process that will be followed to update the plan, along with when this process will occur and who will be responsible for the process?	4-1, 4-2, 4-7	MET

Element D Requirements	Location in Plan (section and/or page number)	Met / Not Met
D3. Does the plan describe a process by which each community will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement 44 CFR § 201.6(c)(4)(ii))		
D3-a. Does the plan describe the process the community will follow to integrate the ideas, information and strategy of the mitigation plan into other planning mechanisms?	3-8, 4-1, AA-4, CA-4, LA-4, C-45, C-46, C-47, C-48	MET
D3-b. Does the plan identify the planning mechanisms for each plan participant into which the ideas, information and strategy from the mitigation plan may be integrated?	C-8, AA-4, CA-4, LA-4, C-45	MET
D3-c. For multi-jurisdictional plans, does the plan describe each participant's individual process for integrating information from the mitigation strategy into their identified planning mechanisms?	AA-4, CA-4, LA-4	MET
Element D Required Revisions		
Required Revision:		

Element E: Plan Update

Element E Requirements	Location in Plan (section and/or page number)	Met / Not Met
E1. Was the plan revised to reflect changes in development? (Requirement 44 CFR § 201.6(d)(3))		
E1-a. Does the plan describe the changes in development that have occurred in hazard-prone areas that have increased or decreased each community's vulnerability since the previous plan was approved?	2-9, 2-14, 2-18, 2-21, 2-25, 2-28, 2-33, 2-36, 2-37, 2-38, 2-39, 2-40	MET
E2. Was the plan revised to reflect changes in priorities and progress in local mitigation efforts? (Requirement 44 CFR § 201.6(d)(3))		
E2-a. Does the plan describe how it was revised due to changes in community priorities?	2-41, 2-42, 3-1, 3-6	MET
E2-b. Does the plan include a status update for all mitigation actions identified in the previous mitigation plan?	3-2, 3-3, 3-4	MET

Element E Requirements	Location in Plan (section and/or page number)	Met / Not Met
E2-c. Does the plan describe how jurisdictions integrated the mitigation plan, when appropriate, into other planning mechanisms?	AA-4, CA-4, LA-4	MET
Element E Required Revisions		
Required Revision:		

Element F: Plan Adoption

Element F Requirements	Location in Plan (section and/or page number)	Met / Not Met
F1. For single-jurisdictional plans, has the governing body of the jurisdiction formally adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))		
F1-a. Does the participant include documentation of adoption?	N/A	
F2. For multi-jurisdictional plans, has the governing body of each jurisdiction officially adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))		
F2-a. Did each participant adopt the plan and provide documentation of that adoption?		MET
Element F Required Revisions		
Required Revision: All resolutions received 8/22/24		

Element G: High Hazard Potential Dams (Optional)

HHPD Requirements	Location in Plan (section and/or page number)	Met / Not Met
HHPD1. Did the plan describe the incorporation of existing plans, studies, reports and technical information for HHPDs?		
HHPD1-a. Does the plan describe how the local government worked with local dam owners and/or the state dam safety agency?	N/A	
HHPD1-b. Does the plan incorporate information shared by the state and/or local dam owners?	N/A	
HHPD2. Did the plan address HHPDs in the risk assessment?		
HHPD2-a. Does the plan describe the risks and vulnerabilities to and from HHPDs?	N/A	
HHPD2-b. Does the plan document the limitations and describe how to address deficiencies?	N/A	
HHPD3. Did the plan include mitigation goals to reduce long-term vulnerabilities from HHPDs?		
HHPD3-a. Does the plan address how to reduce vulnerabilities to and from HHPDs as part of its own goals or with other long-term strategies?	N/A	
HHPD3-b. Does the plan link proposed actions to reducing long-term vulnerabilities that are consistent with its goals?	N/A	
HHPD4-a. Did the plan include actions that address HHPDs and prioritize mitigation actions to reduce vulnerabilities from HHPDs?		
HHPD4-a. Does the plan describe specific actions to address HHPDs?	N/A	
HHPD4-b. Does the plan describe the criteria used to prioritize actions related to HHPDs?	N/A	
HHPD4-c. Does the plan identify the position, office, department or agency responsible for implementing and administering the action to mitigate hazards to or from HHPDs?	N/A	
HHPD Required Revisions		
Required Revision:		

Element H: Additional State Requirements (Optional)

Element H Requirements	Location in Plan (section and/or page number)	Met / Not Met
This space is for the State to include additional requirements		

Plan Assessment

These comments can be used to help guide your annual/regularly scheduled updates and the next plan update.

Element A. Planning Process

Strengths

- Great public outreach strategy – attending County Fair; Use of paper and digital format survey; Multiple presentations
- Detailed descriptions of how existing plans, policy, data will continue to be implemented in this and future plans.

Opportunities for Improvement

- For plan update could use social media as method for outreach

Element B. Risk Assessment

Strengths

- Great use of visual aids and tables to demonstrate the extent and history of hazards
- Thorough analysis of hazards for the County and individual jurisdictions
- Comprehensive discussion of historical events and probability of future events
- The plan includes separate risk assessments for each participating jurisdiction. This highlights the differences in hazard risks among communities.

Opportunities for Improvement

- N/A

Element C. Mitigation Strategy

Strengths

- Very detailed; Key for Mitigation Action Items
- Clearly defined for each jurisdiction
- Good integration of CWPP

Opportunities for Improvement

- N/A

Element D. Plan Maintenance

Strengths

- The plan outlines steps for evaluation and continued participation at the county and jurisdictional level. This helps to create a sense of accountability, ownership, and trust.

Opportunities for Improvement

- N/A

Element E. Plan Update

Strengths

- The plan uses callout boxes to highlight changes in development as it relates to each hazard

Opportunities for Improvement

- For summary purposes consider adding a combined list of changes in development.

Element G. HHPD Requirements (Optional)

Strengths

- N/A

Opportunities for Improvement

- N/A

Resolution # R2024-11

A RESOLUTION OF GILLIAM COUNTY ADOPTING THE GILLIAM COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN AUGUST 2024.

WHEREAS Gilliam County recognizes the threat that natural hazards pose to people and property within Gilliam County; and

WHEREAS Gilliam County has prepared a multi-hazard mitigation plan, hereby known as the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024 in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Gilliam County from the impacts of future hazards and disasters; and


WHEREAS adoption by Gilliam County demonstrates its commitment to hazard mitigation and achieving the goals outlined in the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024.

NOW THEREFORE, BE IT RESOLVED BY GILLIAM COUNTY, OREGON, THAT:

Section 1. In accordance with (local rule for adopting resolutions), Gilliam County adopts the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024. While content related to Gilliam County may require revisions to meet the plan approval requirements, changes occurring after adoption will not require Gilliam County to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

Adopted this 7th day of August, 2024.

GILLIAM COUNTY COURT


Cris Patnode, County Judge


Leah Watkins, County Commissioner


Grant Wilkins, County Commissioner

Resolution #747

A RESOLUTION OF THE CITY OF ARLINGTON ADOPTING THE GILLIAM COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN AUGUST 2024.

WHEREAS the City of Arlington recognizes the threat that natural hazards pose to people and property within Gilliam County; and

WHEREAS the City of Arlington has fully participated in the planning process for the preparation of a multi-hazard mitigation plan, herby known as the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024 in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in The City of Arlington from the impacts of future hazards and disasters; and

WHEREAS adoption by the City of Arlington demonstrates its commitment to hazard mitigation and achieving the goals outlined in the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024.

NOW THEREFORE, BE IT RESOLVED BY GILLIAM COUNTY, OREGON, THAT:

Section 1. In accordance with (local rule for adopting resolutions), The City of Arlington adopts the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024. While content related to Gilliam County may require revisions to meet the plan approval requirements, changes occurring after adoption will not require The City of Arlington to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

Adopted this 7th day of August, 2024.

City of Arlington


Certifying Official
MAYOR
8/17/24

City of Condon Resolution 2025-01

A RESOLUTION OF THE CITY OF CONDON ADOPTING THE GILLIAM COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN AUGUST 2024.

WHEREAS the City of Condon recognizes the threat that natural hazards pose to people and property within Gilliam County; and

WHEREAS the City of Condon has fully participated in the planning process for the preparation of a multi-hazard mitigation plan, hereby known as the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024 in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and


WHEREAS the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in The City of Condon from the impacts of future hazards and disasters; and

WHEREAS adoption by the City of Condon demonstrates its commitment to hazard mitigation and achieving the goals outlined in the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024.

NOW THEREFORE, BE IT RESOLVED BY GILLIAM COUNTY, OREGON, THAT:

Section 1. In accordance with (local rule for adopting resolutions), The City of Condon adopts the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024. While content related to Gilliam County may require revisions to meet the plan approval requirements, changes occurring after adoption will not require The City of Condon to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

Adopted this 7th day of August , 2024.


Jim Hassing, Mayor

8-7-24
Date


Kathryn Greiner, City Administrator

8/13/24
Date

Resolution # _____

A RESOLUTION OF THE CITY OF LONEROCK ADOPTING THE GILLIAM COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN AUGUST 2024.

WHEREAS the City of Lonerock recognizes the threat that natural hazards pose to people and property within Gilliam County; and

WHEREAS the City of Lonerock has fully participated in the planning process for the preparation of a multi-hazard mitigation plan, hereby known as the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024 in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in The City of Lonerock from the impacts of future hazards and disasters; and

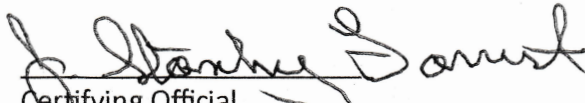
WHEREAS adoption by the City of Lonerock demonstrates its commitment to hazard mitigation and achieving the goals outlined in the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024.

NOW THEREFORE, BE IT RESOLVED BY LONEROCK, OREGON, THAT:

The City of Lonerock adopts the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan August 2024. While content related to Gilliam County may require revisions to meet the plan approval requirements, changes occurring after adoption will not require The City of Lonerock to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

Adopted this 5th day of August 2024.

City of Lonerock


Certifying Official

**Volume I:
Multi-Jurisdictional
Natural Hazards Mitigation Plan**

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EXECUTIVE SUMMARY

Gilliam County developed this Multi-jurisdictional Natural Hazards Mitigation Plan in an effort to prepare for the long-term effects resulting from natural hazards. This plan was developed with and for the following jurisdictions: Gilliam County, the City of Arlington, the City of Condon, and the City of Lonerock. It is impossible 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 public agencies, private sector organizations, and citizens within the community, it is possible to create a resilient community that will benefit from long-term recovery planning efforts.

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 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”—as defined by FEMA this includes individuals, families, businesses and industries, faith and community based organizations, non-profits, media outlets, schools and academia, and state, local and federal governments (<https://www.fema.gov/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 in order to receive federal funds for mitigation projects. Local and federal approval of this plan ensures that the County and listed Cities will remain eligible for pre- and post-disaster mitigation grant funds.

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?

Gilliam County Natural Hazards Mitigation Plan is the result of a collaborative effort between the County, Cities, special districts, citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project Steering Committee guided the plan development process. The project Steering Committee included representatives from the following organizations.

- City of Arlington
- City of Condon
- City of Lonerock
- Gilliam County Assessor's Office
- Gilliam County Emergency Management Department
- Gilliam County Fire Services
- Gilliam County Planning Department
- Gilliam County Road Department
- Gilliam County Sheriff's Office
- Gilliam County Public Health
- Soil and Water Conservation District
- North Gilliam Rural Fire Protection District
- South Gilliam Rural Fire Protection District
- Bureau of Land Management
- Oregon State Fire Marshal
- Oregon State University
- Oregon Department of Forestry

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.

The Steering Committee meetings occurred between June and November 2023. See Appendix B, Planning and Public Process for details on the NHMP participation and outreach during the update process.

Gilliam County Emergency Management convened the planning process and will take the lead in implementing, maintaining, and updating the plan. Public participation played a key role in the development of goals and action items.

How Does this Mitigation Plan Reduce Risk?

This Natural Hazards Mitigation Plan is intended to assist Gilliam County, the City of Arlington, the City of Condon, and the City of Lonerock reduce the risk from natural hazards by identifying resources, information, and strategies for risk reduction. It is also intended to guide and coordinate mitigation activities throughout the County. A risk assessment consists of three phases: hazard identification, vulnerability assessment, and risk analysis, as illustrated in the following graphic.

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

Figure ES.1 Understanding Risk



Source: Oregon Partnership for Disaster Resilience

By identifying and understanding the relationship between natural hazards, vulnerable systems, and existing capacity, communities in Gilliam County are better equipped to identify and implement actions aimed at reducing the overall risk to natural hazards.

What is the County's Overall Risk to Hazards?

Gilliam County reviewed and updated their risk assessment to evaluate the probability of each hazard as well as the vulnerability of the community to that hazard. In addition, the Cities of Arlington, Condon, and Lonerock Steering Committees reviewed the recently updated Gilliam County risk assessment to compare risk and vulnerability particular to their jurisdiction. Table ES.1 and ES.2, below, summarize hazard probability and vulnerability for the County and Cities as determined by the respective Steering Committees.

Table ES.1 shows that the Cities have the same probability ratings as the County for the winter storm, volcanic event, and earthquake hazards. The Cities have different probability ratings than the County for the drought, flood, wildfire and windstorm hazards. The County and Cities did not identify landslides as a distinct hazard; landslides are included in this NHMP as a component of winter storm events.

Table ES.1 Risk Assessment - Probability

Hazard	Gilliam County	Arlington	Condon	Lonerock
Drought	High	Moderate	Moderate	Low
Earthquake	Moderate	Low	Moderate	Low
Flood	High	Low	Moderate	High
Volcanic Event	Low	Low	Low	Low
Wildfire	High	High	Low	High
Windstorm	High	High	Moderate	Moderate
Winter Storm/Landslide	High	High	High	High
Extreme Weather	High	High	High	Moderate

Source: Gilliam County, Arlington, Condon and Lonerock NHMP Steering Committees

Table ES.2 shows the vulnerability ratings as determined by the County and City Steering Committees during their hazard risk assessment evaluations. The table shows that there is significant variability in vulnerability between the County and the participating Cities.

Table ES.2 Risk Assessment - Vulnerability

Hazard	Gilliam County	Arlington	Condon	Lonerock
Drought	High	High	Low	Low
Earthquake	Moderate	High	Low	Moderate
Flood	Moderate	Moderate	Low	Low
Volcanic Event	Low	High	Moderate	Low
Wildfire	High	High	Moderate	High
Windstorm	Moderate	Moderate	Low	Low
Winter Storm/Landslide	High	High	High	Moderate
Extreme Weather	High	High	High	Low

Source: Gilliam County, Arlington, Condon and Lonerock NHMP Steering Committees

What are the Plan Goals?

The plan goals describe the overall direction that the participating jurisdiction’s agencies, organizations, and citizens can take toward mitigating risk from natural hazards.

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

1. Safety of life and the preservation of property and industry.
2. Increased cooperation and collaboration between groups and agencies.
3. Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.
4. Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.

How are the Action Items Organized?

The action items are organized within an action matrix (located in Section 3, Mitigation Strategy) which lists all the multi-hazard and hazard-specific mitigation action items included in the mitigation plan. Data collection, research and the public participation process resulted in the development of the action items. The Action Item Matrix, in Table 3.1, portrays the overall plan framework and identifies linkages between the plan goals, and actions. The matrix documents the title of each action along with, the coordinating organization, timeline, and the plan goals addressed. See Section 3 Mitigation Strategy, Tables 3.1 and 3.2, for the mitigation actions identified for this 2024 NHMP update. See Appendix A, Action Item Forms, for additional details on each of the mitigation actions.

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

How will the plan be implemented?

The plan maintenance section of this plan details the formal process that will ensure that the Gilliam County Natural Hazards Mitigation Plan remains an active and relevant document. The

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

plan will be implemented, maintained and updated by a designated convener. The convener is responsible for overseeing the review processes. Cities and special districts developing jurisdiction specific information to the County plan will also designate a convener and will work closely with the County convener to maintain coordination. The plan maintenance process includes a schedule for monitoring and evaluating the plan semi-annually and producing a plan revision every five years. This section describes how the communities will integrate public participation throughout the plan maintenance process.

44 CFR 201.6(c)(4) – A 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] . . .

After the plan is locally reviewed and deemed complete the Gilliam County Emergency Management Coordinator submits it to the State Hazard Mitigation Officer at the Oregon Department of Emergency Management, which reviews the plan and submits it to the Federal Emergency Management Agency (FEMA – Region X) for review.

The FEMA review will address the criteria outlined in FEMA Interim Final Rule 44 CFR Part 201.6. Once the plan is pre-approved by FEMA, indicated by a letter provided from FEMA to the county called the “Approval Pending Adoption” the county will then formally adopt the plan via resolution. The participating individual jurisdiction’s conveners will be responsible for obtaining local adoption of the Gilliam County Natural Hazards Mitigation Plan and providing the support necessary to ensure plan implementation. In this plan that would be the Cities of Arlington, Condon, and Lonerock. Once the resolution is executed at the local level and documentation is provided to FEMA, the plan is formally acknowledged by FEMA with an approval letter. With this, the county maintains eligibility for the Hazard Mitigation Assistance grant funds called the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Programs, and the Flood Mitigation Assistance program.

The accomplishment of the Natural Hazards Mitigation Plan goals and actions depends upon the maintenance of a competent Steering Committee and adequate support from the County and City departments reflected in the plan in incorporating the mitigation action items into existing County plans and procedures. It is hereby directed that the appropriate County departments and programs implement and maintain the concepts in this plan. Thorough familiarity with this NHMP will result in the efficient and effective implementation of appropriate mitigation activities and a reduction in the risk and the potential for loss from future natural hazard events.

The Gilliam County Court adopted the plan on **August 7, 2024, per Resolution #2024-11**

The City of Arlington adopted the plan on **August 7, 2024 per Resolution #747**

The City of Condon adopted the plan on **August 7, 2024, per Resolution #2025-01**

The City of Lonerock adopted the plan on **August 5, 2024 per Resolution.**

FEMA Region X approved the Gilliam County Multi-jurisdictional NHMP on **August 22, 2024**. With approval of this plan, the entities listed above are now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act’s hazard mitigation project grants through **August 21, 2029**.

SECTION I: INTRODUCTION

This section of the plan provides a general introduction to natural hazards mitigation planning in Gilliam County. In addition, this section 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.” Said another way, natural hazard mitigation is a method of 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” –as defined by FEMA this includes individuals, families, businesses and industries, faith and community based organizations, non-profits, media outlets, schools and academia, and state, local and federal governments (<https://www.fema.gov/whole-community>).

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?

Gilliam County developed this multi-jurisdictional Natural Hazards Mitigation Plan in an effort to reduce future loss of life and damage to property resulting from natural hazards. This plan was developed with and for the following jurisdictions: Gilliam County, the City of Arlington, the City of Condon, and the City of Lonerock. It is impossible 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 losses that can result from natural hazards.

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 mitigation projects. Local and federal approval of this plan ensures that the County and listed Cities will remain eligible for pre- and post-disaster mitigation project grants.

What Federal Requirements Does This Plan Address?

The Disaster Mitigation Act of 2000 (DMA 2000) is the latest 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 was replaced by the Building Resilient Infrastructure and Communities (BRIC) grant program in 2020, and new 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 mitigation plans in place in order to qualify to receive post-disaster HMGP funds. Mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to the individual and their capabilities.

Development of the local mitigation plan update process 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.

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 plan aligns with the goals of Gilliam County's and the Cities Comprehensive Plans, and helps each jurisdiction meet the requirements of Statewide Planning 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 Oregon Emergency Management (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 first Gilliam County Natural Hazards Mitigation Plan was developed and approved in 2008. The 2024 plan update process marks the third update and fourth version of the County's NHMP. This updated NHMP replaces prior versions of the plan.

2024 Plan Update Process

The plan was developed following a schedule developed by Gilliam County and Fair Winds Consulting, LLC. Figure 1.1, NHMP Update Timeline, shows the timeline that was developed for completion of the updates to sections of the NHMP. It was altered as needed throughout the process to reflect then-current levels of progress.

Figure 1.1: NHMP Update Timeline



Source: Oregon Partnership for Disaster Resilience, 2012, 2018 and updated in 2024

Gilliam County funded the 2024 update of the Natural Hazards Mitigation Plan through partnership with the Federal Emergency Management Agency (FEMA). In 2023, Gilliam County received a Hazard Mitigation Grant Program Sub-Grant (HMPG Sub-Grant 4599-02) from FEMA through the Oregon Department of Emergency Management (ODEM) (DR-4599-OR) to assist Gilliam County with their NHMP.

The Gilliam County Emergency Management Department served as the convener for Gilliam County Natural Hazards Mitigation Plan update process. The Gilliam County Emergency Manager developed a Steering Committee to review and update the NHMP and to oversee the planning process. The committee included both existing members from the prior plan updates

and new partners to ensure that County departments and special districts maintained active participation in the process. Between June 2024 and November 2024, the Steering Committee convened for two update meetings. Also during the update process, each City in Gilliam County held a risk assessment meeting to identify and analyze community vulnerabilities for each hazard addressed in the plan. Volume III: Appendix B: *Planning and Public Process* includes meeting materials for each of the plan update meetings.

County Survey and Public Outreach

Public outreach began early on in the spring of 2023; the Contractor used a survey that was included in the public notice of the plan update on the County and City websites (with the exception of Lonerock). The Contractor also attended the County Fair and had a booth discussing Hazard Mitigation, where the survey was available to community members digitally and on paper. The voluntary survey consisted of several questions regarding natural hazard information; community vulnerabilities and hazard mitigation strategies; mitigation and preparedness activities in your household; and general household information. The survey was based on FEMA's template from the Local Mitigation Planning Handbook to determine public perceptions and opinions regarding natural hazards. The County received 12 responses. Volume III: Appendix E: *Survey Results* includes the survey and results.

During early stages of the planning process, pre-existing plans, studies, reports and other technical information from Gilliam County were identified and reviewed for inclusion in the updated plan. Information and policy cultivated from this review was used to inform updates of the County's community profile, risk assessment and mitigation strategy sections, and listed where appropriate for general reference.

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 citizens, businesses, and the environment. Combined, the sections work in synergy to create a mitigation plan that furthers the community's effort to reduce loss of life and property by lessening the impact of disasters. This plan structure enables stakeholders to use the section(s) of interest to them.

Volume I: Multi-jurisdictional Natural Hazards Mitigation Plan

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.

This section provides an overall description of hazards that impact Gilliam County. A hazard summary is provided for each of the hazards addressed in the plan. The summary includes hazard characteristics, history, location and extent, vulnerability and probability.

The hazards specifically addressed and included with this plan are the following:

- Drought;
- Earthquake;

- Flood;
- Volcanic Event;
- Wildfire;
- Windstorm; and
- Winter Storm (includes landslides)
- Extreme Weather Events (extreme heat, extreme cold and hail)

This section allows readers to gain an understanding of the County’s sensitivities – those community assets and characteristics that may be impacted by natural hazards, as well as the County’s resilience – the ability to manage risk and adapt to hazard event impacts.

Section 3: Mitigation Strategy

This section documents the plan goals and actions and also describes the components that guide implementation of the identified mitigation strategies. Actions are based on community sensitivity and resilience factors and the hazard assessments in Section 2 and the Oregon NHMP’s *Region 5: Regional Risk Assessment*

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. Gilliam County, the participating cities and North and South Gilliam County Rural Fire Protection Districts will utilize this implementation and maintenance process as well.

Volume II: Jurisdictional Addenda

Volume II of the plan is reserved for any city or special district addenda developed through this multi-jurisdictional planning process. Each of the Cities within the County participated in the NHMP process and created an addendum. As such, the five-year update cycle will be the same for all of the Cities and the County. This plan includes addenda for the jurisdictions of the Cities of Arlington, Condon, and Lonerock.

Special districts did not create addenda for this version of the NHMP, however, they participated in the planning process and were on the Steering Committee, and they may be included in future updates. See the “Acknowledgments” section in this plan’s cover pages for a list of the people who participated in the development of this NHMP, including those that represent special districts.

Volume III: Mitigation Resources

The mitigation resources are designed to provide the users of the Gilliam County Multi-Jurisdictional 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: Action Item Forms

This appendix contains the detailed action item forms for each of the mitigation strategies identified in this plan.

Appendix B: Planning and Public Process

This appendix includes documentation of all the countywide public processes utilized to develop the plan. It includes invitation lists, agendas, sign-in sheets, and summaries of Steering Committee meetings as well as any other public involvement methods.

Appendix C: Community Profile

This appendix provides an overall description of Gilliam County. The Community Profile is comprised of six different sections that describe Gilliam County from a number of perspectives in order to help define and understand the sensitivity and resilience to natural hazards. These sections include: natural environment capacity, social demographic capacity, regional economic capacity, built capacity, community connectivity capacity, and political capital. The information in this section represents a snapshot in time of the current sensitivity and resilience factors in the County when the plan was updated.

Appendix D: Economic Analysis

This appendix describes the Federal Emergency Management Agency's (FEMA) requirements for benefit cost analysis in natural hazards mitigation, as well as various approaches for conducting economic analysis of proposed mitigation activities. This appendix was developed by OPDR as part of Gilliam County's original NHMP in 2008 and has been updated for this NHMP. It has been reviewed and accepted by the Federal Emergency Management Agency as a means of documenting how the prioritization of actions shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Appendix E: Survey Results

This appendix includes the survey instrument and results from the online survey implemented by Fair Winds Consulting, LLC. The survey aims to gauge household concerns and priorities regarding natural hazards and mitigation strategies.

Appendix F: Grant Programs

This appendix lists pre-disaster and post-disaster federal grant programs, activities, and initiatives for natural hazards mitigation. This section also includes state mitigation programs and contact information.

Appendix G: Climate Change influence on Natural Hazards: Overview and Gilliam County Projections

This appendix includes two climate change reports produced by the Oregon Climate Change Research Institute (OCCRI). OCCRI's *Future Climate Projections: Gilliam County* and the *Climate Change Influence on Natural Hazards in Eight Oregon Counties: Overview of County Reports*, provide 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. The overview discusses all eight of the counties while the respective individual county reports are specific to each county. OCCRI's research and analysis focuses on how climate change is expected to influence natural hazards.

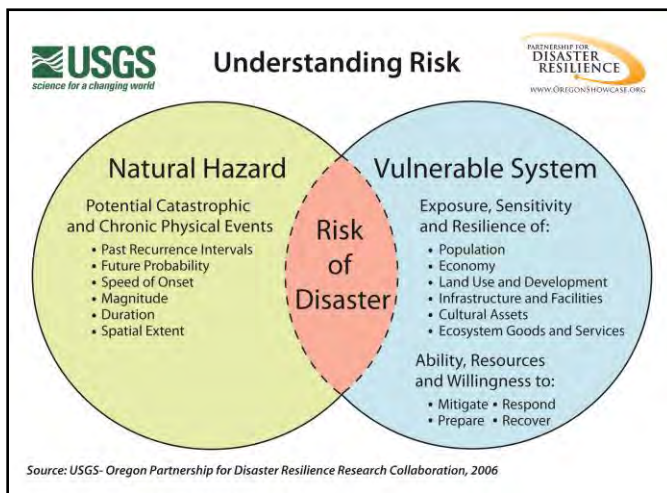
SECTION 2: RISK ASSESSMENT

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.

This section first assesses risk by identifying hazards that can impact the jurisdiction. Potential impacts of each hazard are evaluated according to type, location, and extent. Then, important community assets and system vulnerabilities are identified. Finally, the plan evaluates the extent to which local hazards overlap with, or have an impact on, important assets.

The information presented below, along with community characteristics presented in the Appendix C: Community Profile will be used as the local level rationale for the risk reduction actions identified in Section 3: Mitigation Strategy. The risk assessment process is graphically depicted in Figure 2.1 below. Ultimately, the goal of hazard mitigation is to reduce the area where hazards and vulnerable systems overlap, which is the risk area.

Figure 2.1: Understanding Risk



Source: Oregon Partnership for Disaster Resilience, IPRE

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Hazard Identification

The first step in the risk assessment process is hazard identification. Identifying hazards present in the county and their potential impacts is a way to look ahead towards the future and identify possible mitigation projects. Being cognizant of which hazards will most affect the county and identifying the generalized locations of these events will allow residents, emergency managers, and county staff to be prepared as much as possible. Gilliam County identifies eight natural hazards that could potentially have an impact on the County. These hazards include: drought, earthquake, flood, volcanic event, wildfire, windstorm, winter storm (including landslides) and extreme weather. Table 2.1 displays the hazards identified by Gilliam County compared to the regional hazards identified in the State of Oregon NHMP for the Mid-Columbia Region in which Gilliam County is included.

Table 2.1: Gilliam County Hazard Identification

Gilliam County Hazards*	Oregon NHMP Region 5: Mid-Columbia Regional Hazards
Drought	Drought
Earthquake	Earthquake
Flood	Flood
Volcanic Event	Landslide
Wildfire	Volcanoes
Windstorm	Wildfire
Winter Storm/Landslide	Windstorm
Extreme Weather	Winter Storms
	Extreme Heat

Source*: Gilliam County NHMP Steering Committee, Updated June 1, 2023

Source^: State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia, 2020

Eight out of the nine hazards identified in the Mid-Columbia region (Morrow, Sherman, Wasco, Umatilla, Hood River, and Gilliam Counties) are included within the Gilliam County NHMP. Landslide/debris flow is not identified as a separate hazard by the County, but rather is included within the winter storm hazard category because landslides most commonly occur as a secondary effect of heavy rains. Landslides in the Mid-Columbia Region, also called Region 5, are more common in the Cascade Range and Columbia Gorge area. While Gilliam County does experience extreme heat, the Steering Committee felt extreme weather better fit their jurisdiction. In extreme weather they included extreme heat, extreme cold and hail events. For City specific hazard characteristics, extents, and prior occurrences, see Volume II: *Jurisdictional Addenda*.

FEDERAL DISASTER DECLARATIONS

Looking at the past events that have occurred in the county can provide a general sense of the hazards that have caused significant damage in the county. Significant hazard events are noted via presidential disaster declarations. Observing hazard trends 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 disaster declarations have been approved within every state as a result of natural hazard related events. As of May 2023, FEMA has approved a total of 85 disasters in Oregon, including 45 major fires, 19 severe storms

declarations, 14 flood disasters, two earthquake events, one drought and the Covid 19 Pandemic.¹ A Presidential Major Disaster Declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, and designed to help disaster victims, businesses, and public entities.² When a governor asks for a presidential declaration because of a major disaster or emergency, they stipulate which counties in the state they want included in the declaration. Table 2.2 summarizes the eight major disasters declared for Gilliam County by FEMA since 1953. The table shows that all of the major disaster declarations in Gilliam County have been weather related except for the Covid-19 Pandemic.

Table 2.2: FEMA Major Disaster Declarations - Gilliam County

Declaration Number:	Declaration Date:	Incident(s):	Incident(s) Period:	Individual Assistance:	Public Assistance Categories:
DR-4499-OR	28-Mar-2020	Oregon Covid-19 Pandemic	20-Jan-2020 to 11-May-2023	Yes	A, B
DR-1632	20-Mar-2006	Severe Storms, Flooding, Landslides and Mudslides	18-Dec-2005 to 21-Jan-2006	None	A, B, C, D, E, F, G
DR-1510	19-Feb-2004	Severe Winter Storms	26-Dec-2003 to 14-Jan-2004	None	A, B, C, D, E, F, G
DR-1160	23-Jan-1997	Winter Storms/Flooding	25-Dec-1996 to 06-Jan-1997	None	N/A
DR-1099	9-Feb-1996	Severe Storms, Flooding	4-Feb-1996 to 21-Feb-1996	Yes	A, B, C, D, E, F, G
DR-3039	29-Apr-1977	Drought	29-Apr-1977	None	N/A
DR-413	25-Jan-1974	Severe Storms, Snowmelt, Flooding	15-Jan-1974	Yes	A, B, C, D, E, F, G
DR-184	24-Dec-1964	Heavy Rain, Flooding	24-Dec-1964	Yes	A, B, C, D, E, F, G

Source: FEMA, Oregon Disaster History, Major Disaster Declarations, retrieved 5/23/2023

FEDERAL EMERGENCY DECLARATIONS

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.³ Table 2.3 lists the only federal emergency declaration for the County. In April 1977, a drought was declared for numerous counties in Oregon including Gilliam County.

¹ Federal Emergency Management Agency. Declared Disasters by Year or State. <https://www.fema.gov/disaster/declarations>. Accessed on May 23, 2023.

² Federal Emergency Management Agency. The Disaster Process and Disaster Aid Programs. “A Presidential Major Disaster Declaration.” <https://www.fema.gov/disaster/how-declared>

³ Federal Emergency Management Agency. The Disaster Process and Disaster Aid Programs. “An Emergency Declaration.” <https://www.fema.gov/disaster/how-declared>

Table 2.3: FEMA Emergency Declarations - Gilliam County

Declaration Number:	Declaration Date:	Incident(s):	Incident(s) Period:	Individual Assistance:	Public Assistance Categories:
EM-3039	29-Apr-1977	Drought		None	A, B

Source: FEMA, Oregon Disaster History, Emergency Declarations, retrieved 5/23/2023

The following subsections summarize the characteristics and extent of each hazard. For additional information on each hazard, refer to [Region 5 Risk Assessment](#) in the 2020 State of Oregon Natural Hazards Mitigation Plan⁴.

CLIMATE CHANGE

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. ⁵

The state climate change information, described in detail in the 2020 Oregon NHMP, indicates that hazards projected to be impacted by climate change in Region 5 include drought, wildfire, flooding, landslides and extreme heat. Climate models project warmer drier summers, however projected increases in spring precipitation may counteract some of the effects of warming and result in increases in summer moisture and runoff. While winter storms and windstorms affect Region 5, there is little research on how climate change influences these hazards in the Pacific Northwest. When climate variability information is available, its expected impact is noted in each hazard section.⁶ For more information on climate drivers and the projected impacts of climate change in Oregon, see the section, [Introduction to Climate Change](#), in the State Natural Hazards Mitigation Plan.⁷

For the 2018 update, the Department of Land Conservation and Development (DLCD) contracted with the Oregon Climate Change Research Initiative (OCCRI) to provide an analysis of climate change influences on natural hazards (Appendix G). OCCRI’s *Future Climate Projections: Gilliam County* and the *Climate Change Influence on Natural Hazards in Eight Oregon Counties: Overview of County Reports*, provide 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 (Appendix G).

The basis of the research prepared by OCCRI uses future climate projections that are 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 that result in varying future temperature increases for the State of Oregon.

⁴ Oregon Natural Hazard Mitigation Plan, Region 5 Risk Assessment. https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_11_RA5.pdf

⁵<https://www.oregon.gov/lcd/cl/pages/climate-change-resources.aspx>








⁶ https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_05a_RAStateIntro.pdf

⁷https://www.oregon.gov/lcd/NH/Documents/Approved_2020ORNHMP_05a_RAStateIntro.pdf

The county report describes county-specific projected changes in climate metrics related to the 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.

Table 2.4 provides an overview of expected climate change impacts for Gilliam 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 high confidence that heat waves and droughts will increase and that cold waves will decrease. The table also shows that there is medium confidence that heavy rains, river flooding, wildfire, prevalence of invasive species, and loss of wetland ecosystems 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 G.

Table 2.4 Overview of Expected Climate Change Impacts for Gilliam County

	Heat Waves	↑↑		Heavy Rains	↑↑		Poor Air Quality	↑↑
	Cold Waves	↓↓		River Flooding	↑↑		Windstorms	=
				Wildfire	↑↑		Dust Storms	↓↓
				Increased Invasive Species	↑↑		Drought	=
				Loss of Wetland Ecosystems	↑↑			
Level of Confidence in Direction of Change					Expected Direction of Change			
	High Confidence				Risk Increasing			↑↑
	Medium Confidence				Risk Decreasing			↓↓
	Low Confidence				Risk Unchanging			=

Source: OCCRI, Climate Change Influence on Natural Hazards in Eight Oregon Counties: Overview of County Reports

For the hazards discussion below, it should be noted that Gilliam County and the Cities of Arlington, Condon, and Lonerock each performed a Hazard Vulnerability Assessment (HVA). This HVA will be discussed in more detail later in this Section 2. Each hazard has information about probability and vulnerability that are based on the HVA.

Drought

Significant Changes since Previous Plan:

Four drought events in 2018, 2020, 2021 and 2022 were added to the history section. The future impacts of climate change were expanded upon, as well as fore casted population changes and changes in development that will impact drought risk.

Characteristics

A drought is a period of drier than normal conditions. Drought occurs in virtually every climatic zone, but its characteristics vary significantly from one region to another. Drought is a temporary condition; it differs from aridity, which is restricted to low rainfall regions and is a permanent feature of climate. 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.⁸

Droughts are common in Gilliam County and the surrounding region. Droughts appear to be recurring and they can have a profound effect on the economy, particularly the hydro-power and agricultural sectors. Agricultural industry and fire response services are particularly vulnerable to drought events. Although drought may not cause significant impacts to non-farming communities, the financial impact affects the economic stability of the county. The environmental consequences also are far-reaching. The state addresses drought emergencies through the Drought Readiness Council. This interagency (state/federal council assesses the impact of drought conditions and makes recommendations to the Governor's Office on whether to declare drought in an area.

Drought impacts include damaged grain crops, reduced yields, herd health problems, and reduced productivity or water development projects.

Location/Extent

All of Gilliam County is subject to a drought hazard, particularly since the community has predominantly an agricultural based economy. However, droughts primarily impact the agricultural industry and increase the risk of wildfire hazards. The drinking water supply is rarely impacted.

History

Table 2.5 identifies significant droughts and includes "state of drought emergency" declarations for Gilliam County from 1995 to 2022. Emergency declarations are determined by the governor of the state in order to address ongoing drought, low water conditions, and weather patterns that have the potential to cause local adverse natural and economic conditions in the county. When drought emergencies are declared, state agencies, including the Department of Agriculture, Department of Water Resources, and Oregon Department of Emergency Management, provide assistance and seek federal resources available to mitigate conditions throughout the county. Gilliam County has been in a state of drought emergency 10 out of the last 24 years.

⁸ Ibid

Table 2.5: Drought History in Gilliam County

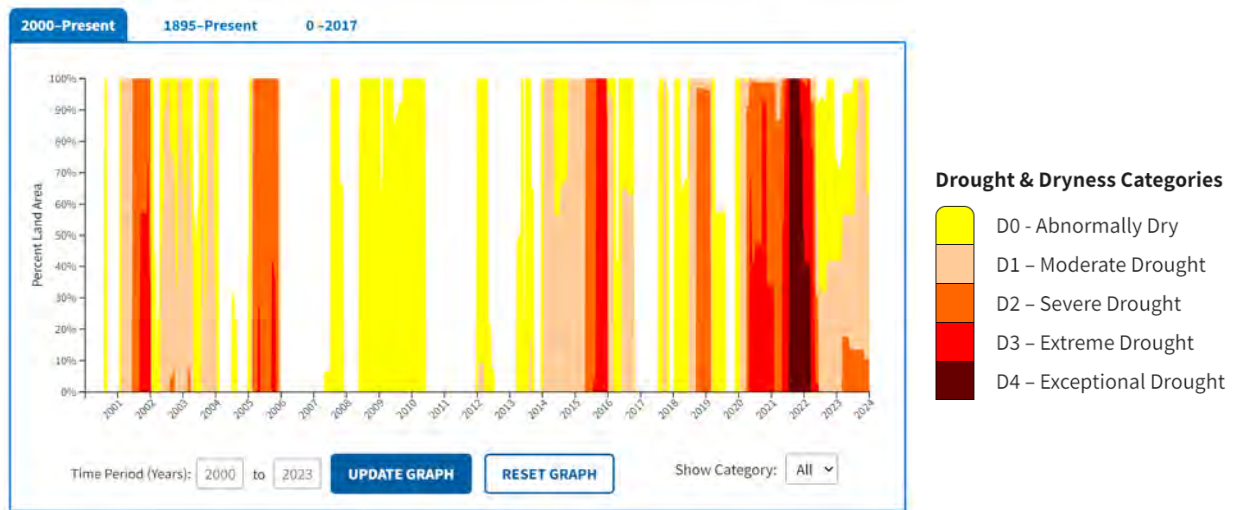
Time Period	Description
1904 to 1905	A statewide drought period for approximately 18 months.
1917 to 1931	A 15-year dry period in Oregon punctuated by brief wet spells.
1939 to 1941	Three-year period of intense drought in Oregon.
1959 to 1964	Drought period primarily affecting eastern Oregon.
1977	A Federal Emergency Declaration was made on April 29, 1977, for 19 counties in Oregon including Gilliam County due to drought conditions.
1985 to 1997	Generally, a dry period with statewide droughts in 1992 and 1994.
2001	Governor John Kitzhaber issued a state of drought emergency in Gilliam County on May 30, 2001. Executive Order No. 01-06 was issued due to conditions caused by drought, low water conditions and energy shortages in the western states.
2005	Governor Theodore Kulongoski issued a state of drought emergency for six counties in Oregon including Gilliam County on April 7, 2005. Executive Order No. 05-05 was issued due to drought and low water conditions.
2008	Governor Theodore Kulongoski issued a state of drought emergency in Gilliam County on September 24, 2008. Executive Order No. 08-23 was issued due to conditions caused by drought and severe weather.
2013	Five Counties were affected statewide, including Gilliam and Morrow Counties; County judge declared an emergency.
2015	Drought emergency declared in 20 out of 36 Oregon counties; declaration maintained from July through December. Condon drinking water supply impacted; wells throughout the County did not recharge.
2018	Determination of a State of Drought Emergency in Gilliam County due to low streamflow, and hot, dry conditions.
2020	Governor Kate Brown issued a State of Drought Emergency in Gilliam and 6 other counties on July 1, 2020. Executive Order No. 20-31 was issued due to unusually low water supplies and hot, dry conditions.
2021	Governor Kate Brown issued a State of Drought Emergency in Gilliam and 5 other counties on May 10, 2021. Executive Order No. 21-11 was issued due to lack of precipitation and unusually low snowpack and streamflow.
2022	Governor Kate Brown issued a State of Drought Emergency in Gilliam and 2 other counties on April 7, 2022. Executive Order No. 22-06 was issued due to low snowpack, low reservoir levels, and low streamflow.
2023	Governor Tina Kotek issued a State of Drought Emergency in Gilliam and 01 other county on August 31, 2023. Executive Order No. 23-20 was issued due to low streamflow, low precipitation, and low soil moisture.

Source: State of Oregon Executive Orders; <https://www.oregon.gov/gov/pages/executive-orders.aspx>; Oregon State Natural Hazards Mitigation Plan 2020; Gilliam County NHMP Steering Committee, June 2023

The graphic below depicts drought conditions for Gilliam County from 2000-January 2024. The data shows that Gilliam has been exposed to extreme and even exceptional drought conditions on a periodic basis in the recent past. It also shows that Gilliam County has been in a state of drought more often than not in the past 24 year. This type of information is a good tool to utilize when the county is evaluating and implementing the drought mitigation actions in this plan. It can be used to help make long term decisions.⁹

⁹ Drought Conditions for Gilliam County, NOAA/NIDIS <https://www.drought.gov/states/oregon/county/Gilliam>

Figure 2.2: Historical Conditions for Gilliam County



Source: Drought Conditions for Gilliam County, NOAA/NIDIS; <https://www.drought.gov/states/oregon/country/Gilliam>. Accessed on 1/10/2024.

Probability and Vulnerability

According to the Gilliam County Natural Hazards Mitigation Plan Steering Committee, the probability of drought recurrence in the county is **high** (meaning several events are likely in the next 5 years) and county vulnerability is **high** (meaning more than 10% of the population and property would be impacted by an average event). History suggests that droughts occur in Gilliam County every 3-6 years, making them a common hazard.

Climate models for Oregon suggest that future regional climate changes include increases in temperature around 0.2-1°F per decade in the 21st Century, along with warmer and drier summers, and some evidence that extreme precipitation will increase in the future. Increased droughts may occur throughout Oregon under various climate change scenarios as a result of multiple factors, including reduced snowpack, rising temperatures, and likely reductions in summer precipitation.¹⁰ However according to the OCCRI report (Appendix G), Gilliam County drought conditions represented by low summer soil moisture and low summer runoff may become less frequent by the 2050s compared to the historical baseline. Warmer, drier summers may be offset by increases in winter and spring precipitation. Determining the condition of aquifers and making smart decisions planning for longer periods of dryness will assist Gilliam County preparing for drought.

The direct effects of drought include crop damage or failure, livestock death or decreased production, wildfire, impaired productivity of forest land, damage to fish habitat, loss of wetlands, and decreased air quality. Drought is also associated with insect infestation, disease, and wind erosion. Indirect effects to society are measured by the economic and physical hardships brought on by drought and by the increased stress on residents of a drought-stricken area. The economic impact of drought is estimated between \$6 and \$8 billion annually in the United States. These costs primarily affect agricultural, forestry, fisheries, recreation and

¹⁰ Oregon Natural Hazard Mitigation Plan, Region 5 Risk Assessment.

tourism, transportation and energy sectors. Potential impacts to community water supplies and farming are the greatest threats in Gilliam County. Currently Gilliam County's population is expected to decrease overall, which could reduce load on water systems. However, Arlington's population is forecasted to grow, which could increase their risk to drought. In the past 5 years there have been no changes in development that impact drought. All parts of Gilliam County are susceptible to drought, with the following areas and issues of particular concern:

- Agriculture
- Drinking water system
- Residential and community wells in rural areas
- Fire response capabilities

Earthquake

Significant Changes since Previous Plan:

This section has been updated to include the most recent damage estimates from DOGAMI. The RVS table has been annotated to show which buildings have been retrofitted or replaced.

Changes in population and changes in development that will impact earthquake risk were added.

Characteristics

The geographic position of this region makes it susceptible to earthquakes from three sources: subduction zone, intraplate, and crustal events. All types of earthquakes in the region have some tie to the subducting, or diving, of the dense, oceanic Juan de Fuca Plate under the lighter continental North American Plate. There is also a link between the subducting plate and the formation of volcanoes some distance inland from the offshore subduction zone. Given its location, Gilliam County is most susceptible to crustal earthquakes, with less potential for impacts from subduction or intraplate events. This suggests that the County can most likely expect shorter duration events with low levels of ground shaking and limited liquefaction.¹¹ Table 2.6 describes the faults located within the County.

Table 2.6: Faults Located in Gilliam County

Name	Class(6)	Fault ID	Primary County, State	Length (km)	Time of most recent deformation	Slip-rate category
Arlington-Shutler Butte fault	A	847	Gilliam County, Oregon	52 km	Middle and Late Quaternary (<750 ka)	Less than 0.2 mm/yr
Columbia Hills structures	B	568	Gilliam County, Oregon	160 km	Quaternary (<1.6 Ma)	Less than 0.2 mm/yr
Unnamed faults northwest of Condon	B	814	Gilliam County, Oregon	22 km	Quaternary (<1.6 Ma)	Less than 0.2 mm/yr
Unnamed fault southeast of Condon	C	Not Mapped				

Source: U.S. Geological Survey (USGS), Quaternary Fault and Fold Database, The Dalles 1° X 2° Sheet

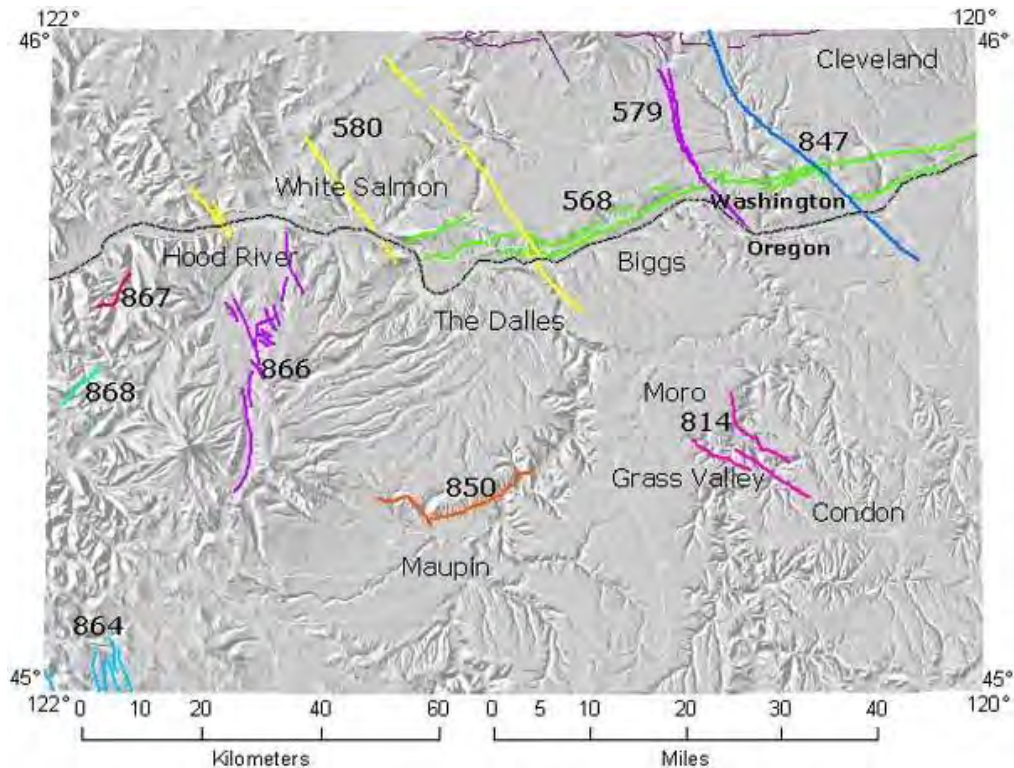
¹¹ Oregon Natural Hazards Mitigation Plan Region 5 Risk Assessment

Location/Extent

There is an inactive part of a fault system that passes within a half-mile of Condon. The largest recorded earthquake registered 1.9 to 4.1 in 2000.¹²

Areas within Gilliam County typically have low ground shake amplification, very low liquefaction susceptibility, and moderate earthquake-induced landslide susceptibility. Areas identified with higher ground shake amplification, liquefactions, and earthquake-induced landslides are located along the John Day River valley as well as in northern portions of the county near the Columbia River. There is no written history of previous significant earthquake occurrences documented in Gilliam County. Actual earthquake damage can vary significantly, depending on the nature and severity of the event, localized soils, and structural vulnerability. Most injuries result from flying/falling building contents and debris. Expected shaking, soft soil hazard areas, and previous earthquake epicenters can be seen in Figures 2.4, 2.5, and 2.6 below. Figure 2.3 shows identified faults located in Gilliam County and the surrounding area. The extent of the earthquake hazard is measured in magnitude. Figure 2.4 shows that recent earthquakes have registered as Magnitude 6 or less (earthquakes at this magnitude are often felt but cause no damage, or only minor damage). Gilliam County can expect similar earthquake magnitudes to occur in the future. The Cascadia Subduction Zone earthquake has the capacity to cause a magnitude 8.5 or greater earthquake; however, due to the distance from Gilliam County the damage locally is expected to be less.

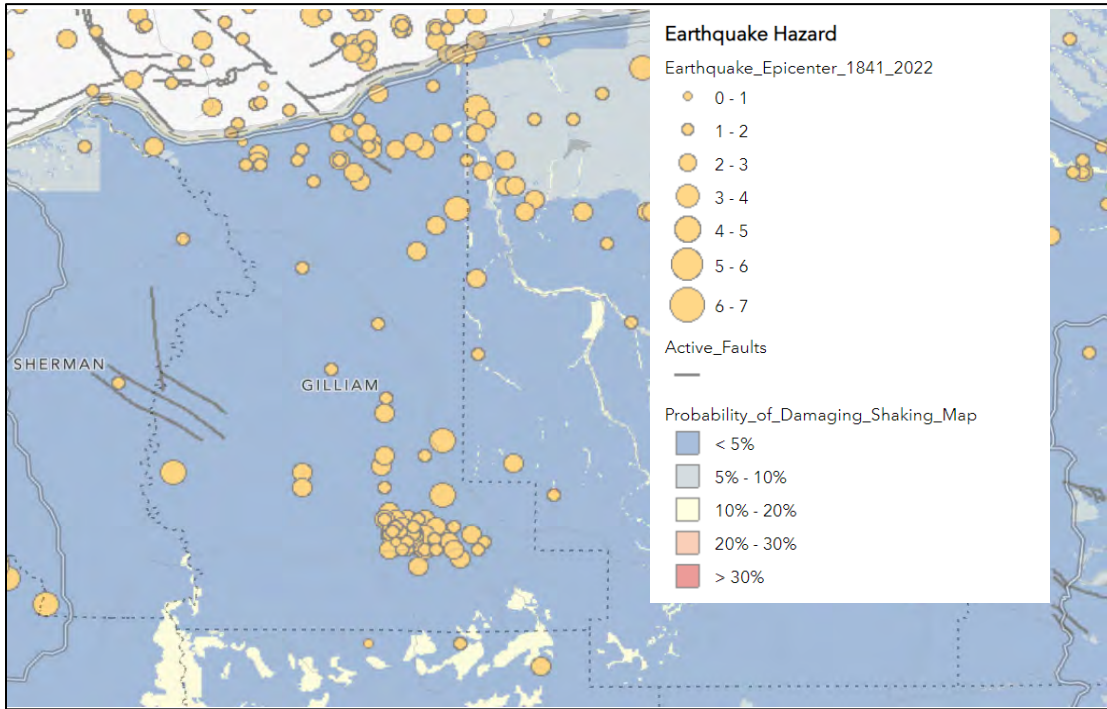
Figure 2.3: Regional Fault Map



Source: [U.S. Geological Survey \(USGS\), Quaternary Fault and Fold Database](#), The Dalles 1° X 2° Sheet

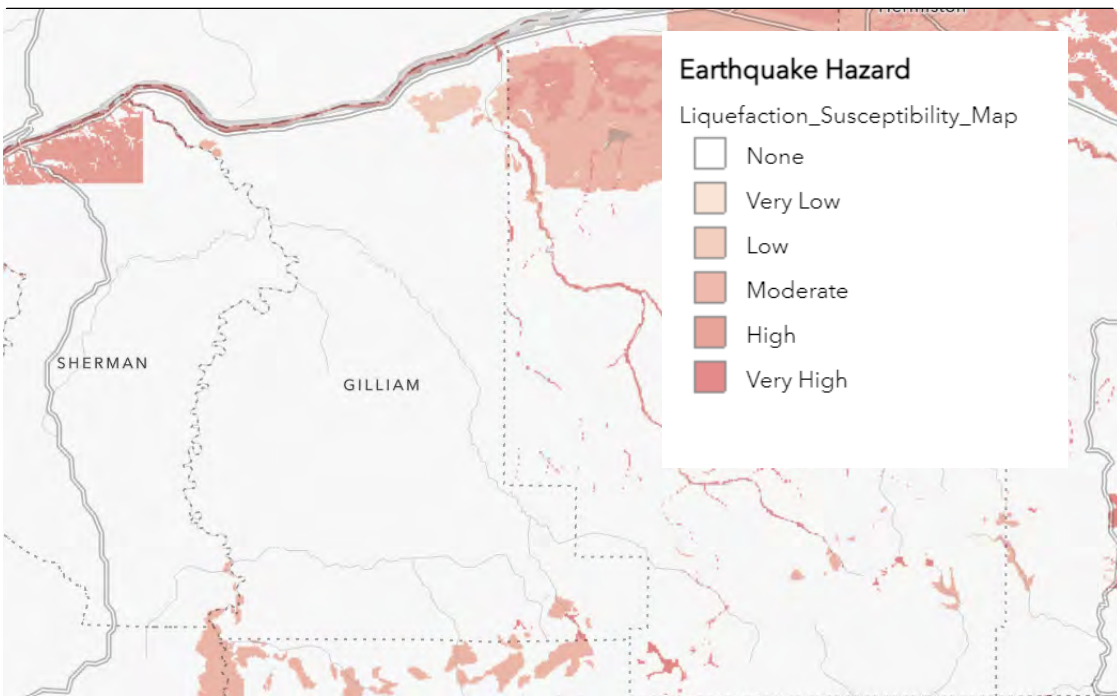
¹² Gilliam County Natural Hazards Mitigation Plan, 2018

Figure 2.4: Active Faults, Earthquake Epicenters, and Probability of Damaging Shaking from Crustal Event



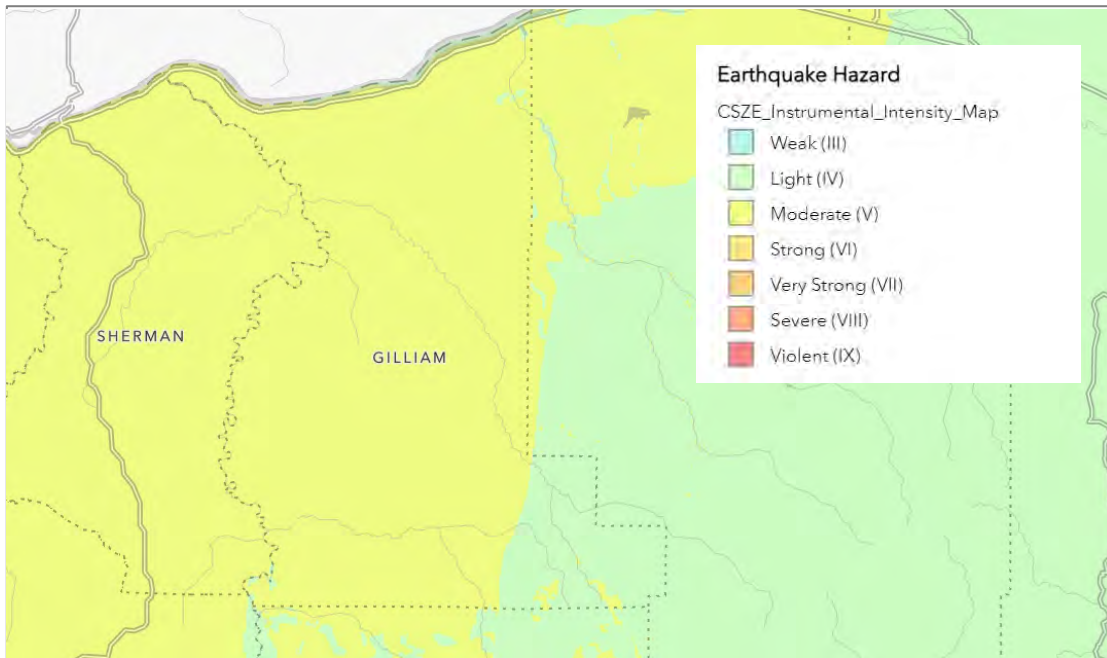
Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI), accessed on 12/19/2023

Figure 2.5: Gilliam County Liquefaction/Soft Soil Hazard



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI), accessed on 12/19/2023

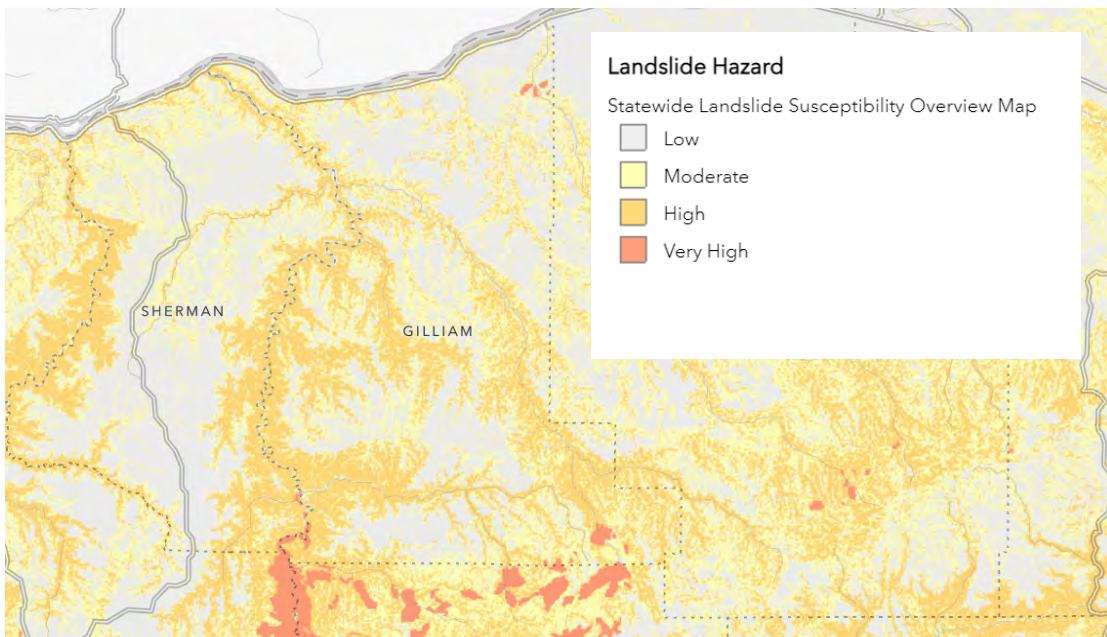
Figure 2.6: Gilliam County Expected Shaking (CSZ event)



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI), accessed on 12/19/2023

Strong ground shaking can also cause landslides and reactivate dormant landslides. Commonly, slopes that are marginally stable prior to an earthquake become unstable and fail. Figure 2.7 shows landslide hazard in Gilliam County, including areas of landslide susceptibility and historic landslides.

Figure 2.7: Gilliam County Landslide Hazard



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI), accessed on 12/19/2023

History

Region 5 has experienced many earthquakes, although they rarely reach magnitudes greater than 2.5M. In the past century, Gilliam County has experienced 83 earthquakes greater than 2.5M, but only 7 larger than 3.5M and one larger than 4.0M.¹³ Earthquake events between 1841 and 2022 can be seen in Figure 2.4. Earthquake events in the Cascade Range are listed in Table 2.7.

Table 2.7 Regional Earthquake Hazard History

Date	Location	Size (M)	Description
Approximate years: 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 villages along the coast.
Mar. 1893	Umatilla, OR	5.7	Occurred on March 7, 1893.
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).
Jan. 1951	Hermiston, OR		Damage unknown.
Apr. 1976	Near Maupin, OR	4.8	Sounds described as distant thunder, sonic booms, and strong wind.
n/a	Mayville, Lonerock	n/a	Felt by some, very low magnitude
n/a	Arlington, Matney Loop	n/a	Reported by local news, felt by few.

Source: Oregon State NHMP, 2020; Gilliam County NHMP Steering Committee, June 2023

Probability and Vulnerability

The Gilliam County Natural Hazards Mitigation Plan Steering Committee determined that both probability and vulnerability for the County to earthquakes is **moderate**. As seen in Figures 2.4 and 2.6, expected shaking from both local faults and a Cascadia event is **moderate**, with limited areas of strong shaking. The very lower liquefaction potential decreases County risk.

The probability of a large Cascadia Subduction event occurring in the next 50 years ranges from 7-12%. The probability of a small or large (8.3M+) Cascadia Subduction event occurring in the next 50 years is 37-43%.¹⁴ In the event of a Cascadia Subduction quake, in the eastern zone, shaking will be moderate, landslides and liquefaction sporadic, and damage generally light. However, eastern Oregon can expect to wait at least 72 hours before major relief arrives, and 1 to 3 years before communities achieve 90% restoration of roads and services. The eastern

¹³ USGS Earthquake Catalog, retrieved 9/17/2023, <https://earthquake.usgs.gov/earthquakes/map>

¹⁴ Oregon Natural Hazard Mitigation Plan 2020, State Risk Assessment.

region may also receive refugees from the coastal and valley regions of Oregon, where relief will arrive 1-2 weeks after an event, and resilience will be reached three years or later after an event.¹⁵

The people and infrastructure along the I-84 corridor, which runs along the northern portion of the region, would be most vulnerable. This multimodal transportation corridor is vital to Oregon's economy and includes a major interstate highway (I-84); two transcontinental rail lines, Union Pacific and Burlington Northern Santa Fe; the Columbia River inland water navigation; major electric power and gas lines; and communication conduits. Moderate shaking and higher liquefaction potential may disruption transportation significantly. Damage to shipping channels and shore facilities, and failure of Columbia River bridges west of Region 5 may have long-term impacts on freight shipments into and out of Gilliam County.¹⁶

Climate change is not expected to impact earthquakes. Gilliam County is expected to see a decrease in population over the next 30 years which may reduce their risk, however the City of Arlington is expected to see an increase in population, and with their higher percentage of children than elsewhere in the county, seismically updating the schools should be a priority.

A major change in development that has impacted the County's overall earthquake risk is that a new seismically fit Condon Grade School was built, replacing the highly vulnerable old school and reducing risk to the youth population in Condon.

2007 Rapid Visual Survey

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. DOGAMI ranked each building surveyed with a 'low,' 'moderate,' 'high,' or 'very high' potential for collapse in the event of an earthquake (Table 2.8). 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. To fully assess a building's potential for collapse, a more detailed engineering study completed by a qualified professional is required, but the RVS study can help to prioritize which buildings to survey. Buildings with a 'high' or 'very high' potential for collapse are listed below. Additional information can be found within the [RVS study](#) on DOGAMI's website (www.oregongeology.org).

Economic losses due to earthquake events have been calculated for Gilliam County; however, the uncertainty in data is so high that results have limited application. In a 1999 Special Paper, DOGAMI estimated that less than 1% of Gilliam County infrastructure would suffer economic losses resulting from either a Cascadia Subduction Zone or crustal event. Damage to buildings will be slight to negligible.¹⁷

¹⁵ Oregon Resilience Plan; February 2013;
http://www.oregon.gov/oem/Documents/Oregon_Resilience_Plan_Final.pdf

¹⁶ Oregon Natural Hazard Mitigation Plan, Region 5 Risk Assessment.

¹⁷ DOGAMI, Special Papers: SP-29, Earthquake damage in Oregon Preliminary estimates of future earthquake losses (1999)

Table 2.8: Gilliam County Buildings Collapse Potential

Facility	Address	Site ID*	Level of Collapse Potential			
			Low (< 1%)	Moderate (>1%)	High (>10%)	Very High (100%)
Condon						
Public Safety						
City of Condon VFD/PD*	128 S Main St	Gill_fir01			X,X	
South Gilliam County RFPD	200 N Main St	Gill_fir04	X			
Gilliam County Sheriff's Office	221 S Oregon St	Gill_pol03				X
Schools						
Old Condon Elementary School*	220 S East St	Gill_sch04	X		X	X
Condon High School	210 E Bayard St	Gill_sch01		X, X		
Arlington						
Public Safety						
Oregon State Police	Hwy 19 and Columbia St	Gill_pol04	X			
North Gilliam County RFPD	1500 Cottonwood St	Gill_fir02	X			
Schools						
Arlington Elementary School	1400 Main St	Gill_sch02				X, X
Arlington High School	1200 Main St	Gill_sch03			X,X	

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>

*Building has been replaced of updated since original RVS

Flood

Significant Changes since Previous Plan:

Flash flood history was updated with new events. The impacts of climate change were expanded upon. Changes in population and changes in development that will impact flood risk were added.

Characteristics

The most common type of flooding is associated with unseasonably warm weather during the winter months coupled with rainfall that can quickly melt snow. This condition, often referred to as rain-on-snow, has produced devastating floods throughout the region. The warm winter weather events most often occur from December through February and can ultimately affect the entire county. Gilliam County is also subject to flash floods, primarily during the spring and summer months. Brief periods of intense rain and/or hail can deposit up to inch of rain in just a

few minutes, occurring sometimes without warning. Other flood events are linked to normal seasonal snowmelt and run-off from agricultural fields.

There are several rivers in the region that produce natural extreme flood conditions. Surprisingly, the Columbia River is not one of them, nor is the John Day River. The Columbia River is regulated by upstream dams, so it does not present much of a problem. This is partly reflected in the federal flood insurance rate maps for the various communities along the river. However, a swollen Columbia River can back up tributary streams to the point where they constitute a significant hazard. This has occurred on a number of occasions. The John Day River (tributary of the Columbia River) is confined to fairly deep canyons with small floodplains. Consequently, it does not present the flood problems associated with other smaller rivers.

Location/Extent

Gilliam County is subject to a variety of flood conditions. Areas particularly susceptible to flooding can include the Columbia River, Lower Rock Creek, Middle Rock Creek, Upper Rock Creek, Thirtymile Creek, Hay Canyon, Condon (city), and Lonerock (city). The principle flood source for Gilliam County is Thirty Mile Creek.

The extent of the special flood hazard area is mapped within FEMA's flood insurance rate maps (FIRMs). Gilliam County's FIRMs date from September 24, 1984. The FIRMs show unmodernized mapping and approximate A zones throughout the County; there are no detailed flood studies for the County or Cities. As of January 2024, FEMA was updating the county's FIRM maps. Figure 2.8 depicts the approximate 100-year floodplain in Gilliam County.

Figure 2.8: 100-year Floodplain (1984 data)



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI), accessed on 7/27/2023

History

Riverine Floods:

Significant floods have occurred along the John Day River. The United States Geological Survey (USGS) McDonald Ferry gauge site is located along the John Day River on the Sherman County and Gilliam County border. The highest recorded gage height at the site crested in December 1964 following significant rain throughout the Pacific Northwest. The “Christmas Day Flood” as it is commonly referred to crested at 13.59-ft at the McDonald Ferry site. The flood did not cause any damage to buildings but washed out several roads in Gilliam County leaving the area isolated for several days. Table 2.9 identifies historical flood records above major flood stage, 11.5 feet, at the USGS gauge site in Service Creek. According to the Northwest Forecast Center, there is an approximately 32-34% likelihood of peak flows surpassing flood stages.¹⁸

Table 2.9: Historical Flood Records, John Day River at Service Creek, 1984-2020

Date	Gage Height (ft)	Streamflow (cfs)
1984-04-17	11.41	16,400
1985-04-11	10.43	14,300
1986-02-23	13.77	25,400
1989-05-10	12.50	20,900
1991-05-20	13.59	24,200
1993-03-24	13.04	22,300
1996-02-09	14.02	25,800
1997-01-01	16.49	35,200
1998-03-24	10.02	12,900
1999-03-01	10.29	13,700
2005-05-17	10.69	14,800
2006-01-01	10.58	14,500
2008-05-18	11.08	16,000
2009-04-22	10.14	13,300
2010-06-05	12.48	20,800
2011-05-16	15.23	31,800
2012-04-27	10.63	14,700
2014-C-10	12.61	21,100
2016-02-15	10.13	12,500
2017-02-10	12.20	20,100
2019-04-09	16.29	33,600
2020-05-21	13.78	24,200

Source: Northwest River Forecast Center, Peakflow, ENSO Summary, https://www.nwrfc.noaa.gov/peak/peak_climo_summary.cgi?stn=SERO3&period=OND

Flash Floods:

Flash Floods as a result of severe weather have historically occurred throughout Gilliam County. Most flash flood incidents occur in the summer months. Table 2.10 identifies flash floods that have affected the City of Condon due to significant rainfall in short period of time. The community of Blalock also experienced flooding in 2016, but specific details were not recorded¹⁹. It is likely that other flash flood events have occurred but were not documented.

¹⁸ Probability of Historical Peaks, Northwest River Forecast Center, Peak Climatology, https://www.nwrfc.noaa.gov/peak/peak_climatology.cgi?stn=SERO3

¹⁹ Gilliam County NHMP Steering Committee, 2018

Table 2.10: Historical Flash Flood, Gilliam County

July 1998	City of Condon	Flash Flood: 2.25 inches of rain in less than two hours. Heavy rain caused flooding in basements and downtown businesses.
August 2003	City of Condon	1.12 inches of rain in 15 minutes. \$7,000 in property damage caused by thunderstorms and flooding.
May 2023	City of Condon	A significant amount of rain coupled with new sidewalks improperly sloped resulting in several downtown businesses flooding.

Source: Gilliam County Natural Hazards Mitigation Plan, 2018, Gilliam County NHMP Steering Committee June 01, 2023

Probability and Vulnerability

The Gilliam County Natural Hazards Mitigation Plan Steering Committee that the probability of flood events is **high**, and the vulnerability to flooding is **moderate**. This is due to the lack of development in the flood zones. While floods occur regularly, they primarily occur in remote rivers with steep banks.

The OCCRI report (Appendix G) describes that the risk for flooding and heavy rain is expected to increase with climate change. The intensity of extreme precipitation events is expected to increase slightly in the future as the atmosphere warms and is able to hold more water vapor. The magnitude of precipitation on the wettest day and wettest consecutive five days per year is projected to increase on average by 17% and 12% by the 2050s. Flood Risk from the Columbia River is not expected to change substantially. The John Day River may experience an increase in winter flood risk due to warmer winter temperatures causing precipitation to fall more as rain and less as snow. While heavy rains and flood risk are increasing, they are not expected to significantly impact Gilliam County citizens.

The overall population in Gilliam County is expected to decrease, which should decrease the county's overall risk, and floodplain development is already well regulated with the Gilliam County Comprehensive Plan. There have been no new developments that increase the County's overall risk to flood. This may change when the ongoing FEMA floodplain update is complete.

Gilliam County and the incorporated Cities of Condon and Arlington participate in the National Flood Insurance Program (NFIP) and are required to regulate floodplain development. Any structure built in the floodplain after 1974 must meet NFIP requirements for elevation and flood proofing. Gilliam County and the incorporated jurisdictions use FEMA developed floodplain maps as the basis for implementing floodplain regulations. The policies in action and claims made within Gilliam County are described below in Table 2.11.

National Flood Insurance Program (NFIP)

Risk Assessment - §201.6(c)(2)(ii): "All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods."²⁰

Flood Insurance Rate Maps in Gilliam County, the City of Arlington and the City of Condon date from September 24, 1984. The City of Lonerock has not been mapped for floodplain purposes, nor does it participate in the National Flood Insurance Program (NFIP). Table 2.11 shows that as of February 2022 there were four NFIP policies in force with a total value of over \$1.1 million. Between 1978 and February 2022, there was one NFIP claim in Gilliam County. As of January 2024, Gilliam County, the City of Arlington, and the City of Condon have zero repetitive flood loss properties. Neither Gilliam County nor any of the cities have had a

²⁰ Code of Federal Regulations. Title 44: Emergency Management and Assistance. Part 201 – Mitigation Planning. Page 10 of 14. Current as of September 12, 2011.

Community Assistance Visit (CAV). In addition, neither Gilliam County nor any of the cities are members of the Community Rating System (CRS).²¹

Table 2.11: NFIP Summary Table

Jurisdiction	FIRM Date	NFIP Status	# NFIP Policies	Total Coverage	# NFIP Claims	Total Paid
Gilliam County						
Unincorporated	9/24/1984	P	4	\$1,105,000	1	\$ 1,156
Arlington	9/24/1984	P	0	0	0	0
Condon	9/24/1984	P	0	0	0	0
Lonerock	NA	NP	0	0	0	0

Source: Source: Chris Fitzsimmons, Gilliam County Emergency Management, Personal Communication, January 2024; ^ P = Participating, NP = Not Participating

Volcanic Event

Significant Changes since Previous Plan:

Changes in population and changes in development that will impact volcanic event risk were added.

Characteristics

Gilliam County is situated east of the Cascade Mountain Range, which historically derived from volcanic activity. Within this range of mountains are several active and potentially active volcanoes. Mount St. Helens, an active volcano in this chain, erupted violently in 1980 and began erupting steam and ash again during fall 2004 and spring 2005. Mount Hood, Mount Jefferson, and Mount Adams are all potentially active volcanoes close to the region. Volcanic activity can produce many types of hazardous events including landslides, fallout of tephra (volcanic ash), lahars, pyroclastic flows, and lava flows.²² Pyroclastic flows are fluid mixtures of hot rock fragments, ash and gases that can move down the flanks of volcanoes at speeds of 50 to more than 150 kilometers per hour (30 to 90 miles per hour).²³ Lahars or volcanic debris flows are water-saturated mixtures of soil and rock fragments and can travel very long distances (over 100 km) and travel as fast as 80 kilometers per hour (50 miles per hour) in steep channels close to a volcano.²⁴ These hazards can affect very small local zones (only meters across) to areas hundreds of kilometers downwind.

Location/Extent

Ash fallout from an eruption in the Cascade Mountain Range can affect the entire county. Table 2.12 identifies prominent volcanoes in the Cascade Mountain Range west of Gilliam County.

²¹ Dave Lentzner, Department of Land Conservation and Development, Personal Communication, February 2018

²² State of Oregon Natural Hazard Mitigation Plan, Region 5: Mid-Columbia, 2015.

²³ Ibid.

²⁴ Ibid.

Table 2.12: Prominent Volcanoes

Name	Elevation	Type	Threat Potential
Mt Rainier	14,410 ft.	Stratovolcano	Very High
Mt St. Helens	8,333 ft.	Stratovolcano	Very High
Mt. Adams	12,276 ft.	Stratovolcano	High
Mt Hood	11,240 ft.	Stratovolcano	Very High
Mt Jefferson	10,495 ft.	Stratovolcano	Low/Very Low
North Sister	10,085 ft.	Complex volcano	Very High
Middle Sister	10,047 ft.	Complex volcano	Very High
South Sister	10,358 ft.	Complex volcano	Very High
Mt. Bachelor	9,068 ft	Stratovolcano	Moderate
Newberry Crater	7,986 ft.	Shield shaped	Very High
Crater Lake (Mt. Mazama)	8,926 ft. (Mt. Scott)	Caldera	Very High

Source: Oregon State Natural Hazards Mitigation Plan, 2020

The extent of volcanic event hazards within Gilliam County is limited to light tephra accumulation (ashfall), primarily from events at Mt. St Helens, Mt. Adams, Mt. Hood, and Mt. Jefferson when wind direction travels east of the Cascades. Volcanic activity from more distant volcanoes will have less impact upon the County.

History

Mount Hood’s eruptive history can be traced to late Pleistocene times (15,000–30,000 years ago) and will no doubt continue. The most recent series of events (1760–1810) consisted of small lahars and debris avalanches; steam explosions and minor tephra falls occurred between 1859 and 1865. Mount Hood’s recent history also includes ashfalls, dome building, lahars, pyroclastic flows, and steam explosions. Regional volcanic history is described in Table 2.13.

Table 2.13: Volcanic history in the Cascade Range

Date	Location	Description
About 4,000 to 3,000 YBP	Sand Mountain, central Cascades	Lava flows and cinder cones in Sand Mountain field.
About 3,000 to 1,5000 YBP	Belknap Volcano, central Cascades	Lava flows and tephra.
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.
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.
1980	Mount St. Helens (Washington)	Mt. St. Helens erupts: Debris avalanche, ashfall, and flooding on Columbia River. 57 people died.

Source: Oregon State Natural Hazards Mitigation Plan, 2020

Probability and Vulnerability

The Gilliam County Natural Hazard Mitigation Plan Steering Committee determined that the probability of a volcano event is very low, and the vulnerability from a volcano event is low. It is unlikely that Gilliam County would be affected by lahars or pyroclastic flows directly, but ashfall would be a problem.

Mount St. Helens remains a probable source of ashfall. It has repeatedly produced voluminous amounts of this material and has erupted much more frequently in recent historical time than any other Cascade volcano. The location, size, and shape of the area affected by ashfall are determined by the vigor and duration of the eruption and the wind direction. Because wind direction and velocity vary with both time and altitude, it is impossible to predict the direction and speed of ash transport more than a few hours in advance.

Geoscientists have provided some estimates of future activity in the vicinity of Crater Rock, a well-known feature on Mount Hood. They estimate a 1 in 300 chance that some dome activity will take place in a 30-year period (1996-2026). For comparison, the 30-year probability of a house being damaged by fire in the United States is about 1 in 90. The probability of 1 cm or more of tephra fall-out from eruptions anywhere in the Cascade Range in Gilliam County is 1 in 1,000.²⁵

Persons with respiratory problems are endangered, transportation, communications, and other lifeline services are interrupted, drainage systems become overloaded/ clogged, buildings can become structurally threatened, and the economy takes a major hit when a region is impacted by ash fall (tephra fallout). Any future eruption of a nearby volcano (e.g., Hood, St. Helens, or Adams) occurring during a period of easterly winds would likely have adverse consequences for the county. With Gilliam County's predicted decrease in population, and lack of developments that will be negatively effected by volcanic ash, Gilliam County's risk is not expected to increase.

Wildfire

Significant Changes since Previous Plan:

Additional wildfires have been added to the history table. The impacts of climate change have been expanded upon. Changes in population and changes in development that will impact wildfire risk were added.

Characteristics

Gilliam County contains a diverse set of wildfire hazard and risk situations. Conditions throughout the county are conducive to large and fast moving wildfires. The Columbia Gorge serves as a funnel for east and west winds, where direction depends solely on the pressure gradient, and wind speeds can reach 80 mph.

Land ownership and resultant management and suppression capabilities and protocols in this area also affect the potential for wildfires. In Region 5 of Oregon, the most significant land ownership falls to federal agencies, and includes forested and wilderness areas. Federal lands in

²⁵Oregon Natural Hazard Mitigation Plan, NHMP Region 5: Mid-Columbia, 2020.

this area are characterized by dense stands, heavy underbrush, and ladder fuels, increasing the potential for wildfires. County, state, and private lands contribute to the remainder, with the majority of land being privately owned in Gilliam County. These lands have a variety of management practices resulting in a mix of stand conditions and resultant fire potential. As the number of dwellings extends into these areas the potential for ignition and losses increases. Many of these communities in the Wildland Urban Interface (WUI) are far from Fire Agencies, which reduces their likelihood of surviving a wildfire.

Location/Extent

Gilliam County is subject to county wide wildfire hazard due to frequent droughts, warm summer weather, terrain, crops, and natural vegetation. Areas where wheat and other crops and natural vegetation are close to population centers, including Arlington and Condon, are particularly hazardous.²⁶

Several Wildland Urban Interface (WUI) areas exist with the potential for property and human life loss during a wildfire event. Following are conditions and concerns identified in the Gilliam County Community Wildfire Protection Plan (2022) that are found in portions of the County which contribute to the wildfire threat and potential for catastrophic losses:

- The John Day River Canyon with numerous side canyons, all with very steep slopes.
- Large remote areas with no or limited vehicle access.
- Residential developments next to areas with heavy fuel loads. Some homes in these areas do not have adequate defensible space around them.
- Climatic and topographic conditions conducive for large wildfires. Hot and dry conditions exist during the fire season throughout the county. Some portions, especially in the Columbia River Gorge area, have frequent high winds which can contribute to fast moving fires that are difficult to control. Much of the county has moderate to steep slopes, which add to the rate of wildfire spread and suppression difficulty.
- Large agricultural areas planted to mainly grain plus significant Conservation Reserve Program (CRP) fields. Both of these agricultural types have the potential for fast moving fires, which can destroy valuable crops in short periods of time.
- Risk factors for starting wildfires. A major railroad and Interstate Highway 84 along the Columbia River represent significant ignition sources. Lightning has ignited frequent fires in the recent past. Power lines, debris burning, and equipment use also add to the risk. Most wildfires in the county are human caused.
- Fire districts with limited resources and large coverage areas.

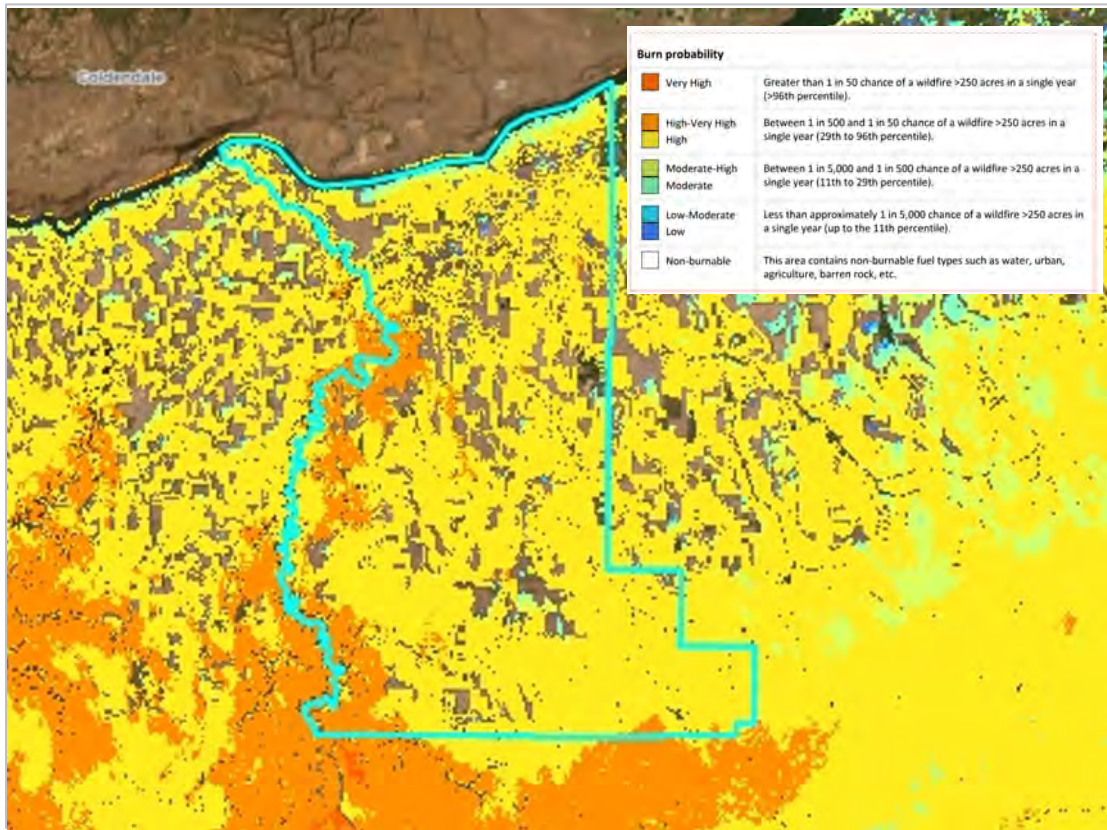
Vegetation throughout the county consists mainly of grass/sagebrush type with scattered cultivated fields. There are virtually no native trees with the exception of a few areas containing

²⁶ Gilliam County Wildfire Protection Plan, 2022

junipers and ponderosa pine in the southeast part of the county. Much of the farmland is in dry-land crops with a few irrigated fields along creek bottoms. There are several significant risk factors including the railroad and interstate highway along the Columbia River. Housing density is low with the exception of the incorporated cities of Arlington and Condon. Suppression response time to most areas in the County is more than 20 minutes. It is important to note that while the overall risk rating for the County is considered high, the on-the-ground conditions vary considerably because of slope, aspect and elevation differences. There are steep hillsides along the John Day River and its side canyons which present conditions for extreme fire behavior and long flame lengths. Further, during windy conditions in the hot dry periods of summer, the risk is considered much higher than during the rest of the year. Importantly, cultivated fields of grain and CRP lands contain heavy fuel loads and are subject to fast moving and extreme fire behavior.²⁷

The extent of the hazard is greatest along the counties western and southern boundaries (see Figure 2.9). In these areas, there is high burn probability. Most of the county has less severe (moderate or less) wildfire burn probability that include expected flame lengths less 8-feet under normal weather conditions. However, conditions vary widely and with local topography, fuels, and local weather (including wind) conditions. Under warm, dry, windy, and drought conditions expect higher likelihood of fire starts, higher intensity, more ember activity, and a more difficult to control wildfire that will include more fire effects and impacts.

Figure 2.9: Extent of Wildfire Hazard (Burn Probability)



Source: Oregon Wildfire Risk Explorer - Advanced Report Gilliam County, December 22, 2023

²⁷Gilliam County Community Wildfire Protection Plan, 2022

History

Table 2.14 describes historical wildfires in Gilliam County.

Table 2.14: Historical Wildfires in Gilliam County

Date	Location	Damages
1994	Gilliam County	40,000 acres burned in Gilliam County
1998	Central Gilliam County	Lightning caused a fire ten miles north of Condon. Second lightning fire caused another fire a day later.
1998	Blalock	A range fire near Blalock caused by a bird on a powerline. During repairs, a line sparked and caused a second fire that burned a few hundred acres of wheat, several outbuildings, and grain storage.
2000	Gilliam County, Morrow County	. The Willow Creek Fire destroyed 27,000 acres in Gilliam County and Morrow County.
2004	Gilliam County, Morrow County, Umatilla County	\$6,000.00 in property damage throughout the three counties.
2005	Gilliam County, Morrow County, Umatilla County	\$113,000.00 in crop damage throughout the three counties.
2005	Gilliam County, Morrow County, Umatilla County	\$10,000.00 in property damage throughout the three counties.
2005	Gilliam County, Morrow County, Umatilla County	\$500,000.00 in property damage throughout the three counties.
2011	Buckhorn	27,000 acres burned in one week; lightning ignition
2014	South Gilliam County (Richmond Road)	. 27,000 acres burned; \$400,000 in property damages
2015	Philippi Park	3,000 acres burned
2016	Scott Canyon Fire	Burned 33,000 acres; human caused
2017	Arlington	9,000 acres burned
2018	Lonerock	5,053 acres burned
2018	Gilliam County; Jack Knife	15,590 acres burned
2018	Gilliam County; Seale	23,596 acres burned
2018	Condon, Stubblefield	Invocation of Emergency Conflagration Act for the Stubblefield and other fires in Gilliam and Wheeler Counties
2020	Rock Creek	1,037 acres burned
2023	Rattlesnake	320 acres burned
2023	Devil's Butte Fire	2,864 acres burned, started by a lightning strike.
2023	Cottonwood Canyon	2,370 acres burned. Started by a campfire on the Sherman Side.

Source: Oregon Wildfire Risk Explorer, Oregon State Natural Hazards Mitigation Plan, 2020; Gilliam County NHMP Steering Committee, June 2023

Probability and Vulnerability

The Gilliam County NHMP Steering Committee determined that the probability of wildfires in the County is **high**, and the vulnerability to wildfires is **high**. Wildfires occur annually, but they rarely impact people. More often, they consume grain fields, pasture and utility infrastructure. All communities in Gilliam County are considered part of the Wildland Urban Interface areas.²⁸

Weather patterns can produce summer lightning storms that start many fires. These multiple starts can put a strain on the 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. It is likely that increasing temperatures due to climate change will increase the likelihood of wildfires in Gilliam County.

The OCCRI report (Appendix G) identifies that the risk of wildfires is increasing. Wildfire risk, as expressed through the frequency of very high fire danger days, is projected to increase under future climate change by 41%, or an average of 14 more days of very high fire danger by the 2050s under higher emission scenarios. Warmer and drier conditions during the summer months have contributed to an increase in fuel aridity and enable more frequent large fires. The lengthening of the fire season is largely due to declining mountain snow pack and earlier spring snow melt. Additionally, warmer drier summers coupled with decreases in summer soil moisture contribute to more high fire danger days.

Disruption to the municipal water supply and irrigation water supply from wildfires would negatively impact all of the residents and agricultural operators that depend on this resource by reducing water quality and availability. Roads, bridges, and evacuation routes could be compromised, limiting the ability of firefighters to reach the fire as well as inhibiting evacuation procedures. Utilities including Bonneville Power Administration Power lines, Portland General Electric and Northwest Natural Gas electrical and gas distribution lines and communication infrastructure are also at risk.

The economic stability of Gilliam County is dependent on a major interstate highway (I-84). Closures can also be expected in the face of low or no visibility secondary to wildfire or inclement winter weather. Additional economic sectors that could be affected by wildfire are agriculture, forest products, tourism, manufacturing, recreation, and power generation.

Gilliam County is expected to see a decrease in overall population over the next 20 years, but Arlington is expected to have an increase in population. Less people located in rural areas can lower the County's risk as a whole, but a denser population in Arlington will increase their risk. Developments in the last five years have not increased wildfire risk, but all future developments need to consider wildfire mitigation activities and building structures wildfire resistant, as climate change predicts wildfires will get worse.

For more information on wildfire risk areas and protection strategies, see the Gilliam County Wildfire Protection Plan.²⁹

²⁸ Oregon Wildfire Risk Explorer, 2023

²⁹ Gilliam County Wildfire Protection Plan, 2022;

Windstorm

Significant Changes since Previous Plan:

Several new history events were added to this section. Changes in population and changes in development that will impact windstorm risk were added.

Characteristics - Windstorm

A windstorm is generally a short duration event involving straight-line winds and/or gusts in excess of 50 mph. The Columbia Gorge is the most significant east-west gap in the mountains between California and Canada. It serves as a funnel for east and west winds, where direction depends solely on the pressure gradient. High winds in this area of Oregon are well-known making it a popular wind surfing destination and magnet for large-scale wind-energy producers. Once set in motion, the winds can attain speeds of 80 mph, halt truck traffic, and damage structures and facilities.

Gilliam County, particularly the northern section of the county near the Columbia River, regularly experiences extreme wind events. The persistent high winds that occur along the Columbia River Gorge have resulted in the application of special building code standards for many of the counties in the region. All manufactured homes in Region 5 (which includes Gilliam County) that are within 30 miles of the Columbia River must meet special anchoring (i.e., tie-down) standards (Section 307: Wind Resistance).³⁰ Note that none of the eight disaster declarations in Table 2.2 are windstorms.

Location/Extent - Windstorm

The entire County experiences strong winds, with higher intensity in areas along the Columbia River and Interstate Highway 84 near Arlington, the flats between Arlington and Condon as well as areas between Condon and the City of Wasco (in Sherman County). Table 2.16 shows the expected wind speeds from windstorm events in Gilliam County.

Characteristics – Tornado

Tornadoes normally descend from the large cumulonimbus clouds that characterize severe thunderstorms, but can also form from a single storm cloud. They form when a strong crosswind (sheer) intersects with strong warm updrafts in these clouds causing a slowly spinning vortex to form within a cloud. Eventually, this vortex may develop intensity and then descend to form a funnel cloud. When this funnel cloud touches the ground or gets close enough to the ground to affect the surface it becomes a tornado. Tornadoes are measured using the Enhanced Fujita Scale (EF) ranging from EF0 to EF5.

³⁰ Gilliam County Wildfire Protection Plan, 2022

Location/Extent - Tornado

All of Gilliam County is subject to a tornado. However, the flats between Arlington and Condon are particularly vulnerable. There are two tornadoes in Table 2.15 and they both happened more than 60 years ago. Past tornadoes have measured as EF0 on the Enhanced Fujita Scale; future tornadoes can be expected within the EF0 category.

History³¹

Table 2.15 Historic Windstorm Events

Date	Location	Description
April 15, 1925	A poorly defined tornado occurred near Condon around 10:30 AM	There was reported damage to warehouses, vehicles, and other buildings along the northeast track of the storm totaling roughly \$10,000.
April 12, 1957	In the initial stages a long thin rope-like funnel descended from a heavy cumulonimbus cloud over southeastern Gilliam County nearly due west of Lone. It moved rapidly eastward into Morrow County and dissipated near Lexington in South central Morrow County	The path varied from less than 100 yards to nearly a quarter-mile width, with an overall length of 15 to 20 miles. The tornado crossed over open range and caused little damage. One telephone pole was pulled out of the ground and large quantities of dust and sagebrush were carried aloft. While hail was generally less than one-half inch diameter, a few hailstones of over one inch in diameter were reported near Heppner. Fortunately, the hail fell in rangeland and little damage resulted. According to the National Weather Service (NWS), the tornado was rated an F0, (40 to 72 mph winds, 45 to 78 mph gusts) on the Fujita scale, which was the scale used prior to 2006 when NWS unveiled the enhanced Fujita Scale.
October-December 2004	Gilliam, Morrow, and Umatilla Counties	Strong windstorms caused \$500 in property damage.
February 2005	Gilliam, Morrow, and Umatilla Counties	Strong windstorms caused \$3,000 in property damage
January 2007	Gilliam, Morrow, Sherman, Wasco, and Umatilla Counties	\$5,000 in property damage; wind speed reached 64 mph
November 2012	Wasco, Sherman, Umatilla, Gilliam, Morrow, Union, and Wallowa Counties	74 mph winds caused \$120,000 in property damage
November 2016	Dust storm impacted OR 19	Storm traveled 10 miles; significant property damage
2020	Arlington and Condon	Severe windstorms in Arlington and Condon

Source: State of Oregon Executive Orders; <https://www.oregon.gov/gov/pages/executive-orders.aspx>; Oregon State Natural Hazards Mitigation Plan 2020; Gilliam County NHMP Steering Committee, June 2023

³¹ National Oceanic and Atmospheric Administration. National Weather Service Portland Forecast Office. Storm Event Database <https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=41%2COREGON>

Probability and Vulnerability

The Gilliam County Natural Hazards Mitigation Plan Steering Committee determined County probability for a windstorm event is **high**, while County vulnerability for a windstorm is **moderate**.

The OCCRI report (Appendix G) describes that the risk of windstorms is unchanged for Gilliam County. High winds occur yearly in Gilliam County. Many buildings, utilities, and transportation systems are vulnerable to wind damage. This is especially true in open areas, such as natural grasslands or farmlands. Structures most vulnerable to high winds include insufficiently anchored manufactured homes and older buildings in need of roof repair. Table 2.16 shows the 1-minute average wind speeds that constitute significant wind events. Gilliam County's predicted decrease in population should reduce the county's risk, and no new developments have changed the county's risk. All future housing development must be windproof and follow established regulations.

Table 2.16 Probability of Severe Wind Events (Region 5)

	25-Year Event (4% annual probability)	50-Year Event (2% annual probability)	100-Year Event (1% annual probability)
Region 5: Mid-Columbia Gorge	75 mph	80 mph	90 mph

Source: Oregon State Natural Hazard Mitigation Plan, 2020

Winter Storm

Significant Changes since Previous Plan:

Hazard history tables were updated, hail and severe thunderstorms were moved to extreme weather. Climate Change impacts were expanded on.

Gilliam County is known for severe weather situations including severe snow storms, ice storms, temperature drops, and landslides. Winter storms can cause transportation routes in and out of the county to become impassable, they can also cause power outages. Landslide hazard is described within this section because landslide hazard events only occur as a secondary impact of storm events; landslides do not occur independently. Furthermore, they occur rarely and do not constitute a significant risk as a stand-alone hazard.

Characteristics – Winter Storm

Severe winter storms include snowstorms, rainstorms, ice storms, and temperature drops. Gilliam County annually experiences cold winter conditions. This is particularly true through the Columbia River Gorge where frigid air sometimes moves westward out of the Wallowa Mountains. During these periods, it is not unusual to receive snow or ice storms. This is advantageous in at least one respect in that 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 brought highway traffic to a standstill. Windy and icy conditions have closed Oregon's principal east-west transportation route, Interstate Highway 84, for hours. In these situations, travelers must seek accommodations, sometimes in communities where lodging is very limited. Furthermore,

during winter heat, food, and the care of livestock are everyday concerns. Access to farms and ranches can be extremely difficult and present a serious challenge to local emergency managers.

Location/Extent

Winter storms occur throughout the County. These events have relatively predictable and longer speeds of onset, however, the effects of winter storms are often long lasting. Areas and transportation routes along Interstate Highway 84 around Arlington are subject to deep drifting snow and zero visibility. Also, transportation routes along Oregon Route 206 from Wasco (Sherman County) to Condon and along Oregon Route 19 from Arlington to Fossil (Wheeler County) are particularly subject to deep drifting snow and zero visibility. Heavy snowfall can cause road closures, traffic accidents, and power outages from downed power lines.

History

Of the eight disaster declarations for Gilliam County, listed in Table 2.17, five are for winter storms. The Gilliam County NHMP Steering Committee identified the following events as additional hazard history:³²

Table 2.17: Winter Storm Historic Events

Date	Location	Description
Dec. 1892	Northern Oregon	15-30 inches of snowfall
Feb. 1986	Gilliam County	Winter storm led to traffic accidents and broken power lines
Feb. 4, 1996	Gilliam County	Winter storm led to severe flooding and severe damage to several county roads. The damage included severe shoulder damage requiring placement of base rock material. Other damage included sections of road caved away and existing aggregate lost, culvert damage, channel damage.
Dec. 1996- Jan. 1997	Gilliam, Hood River, Morrow, Sherman, Umatilla, and Wasco Counties	Severe Storms and Flooding, Federally Declared Disaster, DR-1099; Included hundreds of landslides
Dec. 2003- Feb. 2004	Statewide	During these storms, schools closed for a week and local store inventories significantly diminished; included landslides
Jan 2005	Gilliam, Morrow, and Umatilla	Severe weather caused 33 injuries: including landslides.
Dec. 2005- Jan. 2006	24 Oregon Counties including: Gilliam, Jefferson, Josephine, Lake, Sherman, Wasco, and Wheeler	Heavy rains and flooding created a threat to life, safety, and property. Beginning December 22, 2005, and continuing, heavy rains have caused flooding, landslides, and erosion throughout these counties, resulting in significant damage to the state highway system. Executive order O6-01 (Oregon) on January 13, 2006. Damage was recorded on Wetherford, Hoag Heritage, Mason Davidson Road, Ferry Canyon, Wolfe Hollow, Scotts Canyon, Clem, Mikkalo, French Charlie and Rock Creed Roads.
Feb-Mar 2016	Gilliam County	Record snowfall, 20 days of snow OR 206 closed and public rescues necessary; County staff unable to access necessary equipment
Mar. 2017	Gilliam County	Rock Creek Bridge Washed out
2021	Statewide	Determination of State of Emergency in Oregon due to severe winter weather that includes snow accumulation and sustained temperatures below freezing across the state; 2021-37

³² Gilliam County NHMP Steering Committee, June 2023

³³ Ibid

Characteristics – Landslide/Debris Flow

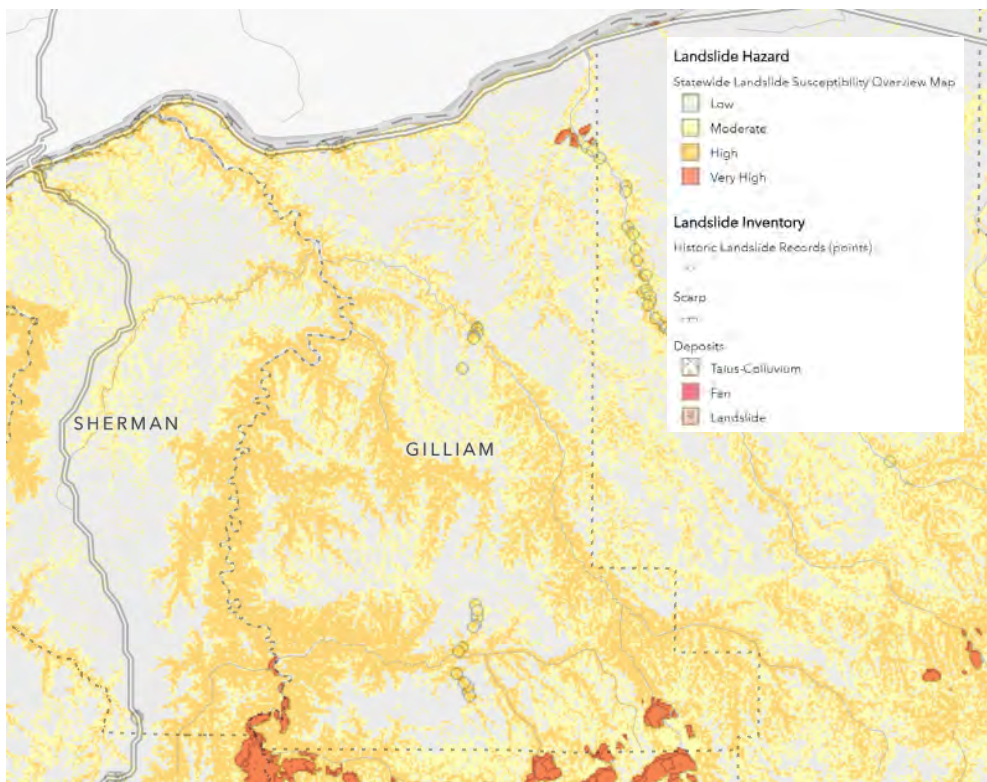
The general term landslide refers to a range of geologic failures including slides, flows, falls, topples, and spreads. Most slope failures in Gilliam County are complex combinations of these distinct types, but the generalized groupings provide a useful means for framing discussion of slide characteristics, identification methods, and potential mitigation alternatives. These basic types are combined with the type of geologic material to form the common landslide names such as debris flow and rock fall.

Some landslides can move at rapid rates and thus pose life threats. These are commonly channelized debris flows, debris avalanches, and rock falls. These types of rapidly moving landslides are common throughout the region, especially along the steep slopes in the Columbia River Gorge, however they rarely impact Gilliam County.

Location/Extent

Areas throughout Gilliam County may be affected by landslide and debris flows. Areas particularly susceptible to landslides include Condon Canyon, Blalock Canyon Road, Lonerock Road, Lost Valley Road, Quinton Canyon Road, Oregon Route 206, and Oregon Route 19. Figure 2.10 depicts landslide risk areas in Gilliam County; most landslide risk is in remote areas. The population centers of Arlington, Condon, and Lonerock are not threatened by landslides. Thirty-one percent (31%) of the land in Gilliam County has “high” or “very high” landslide susceptibility, 32% has “moderate” susceptibility, and 37% has “low” susceptibility.³⁴

Figure 2.10 Gilliam County Landslide Susceptibility Area



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI), accessed on 12/19/2023

³⁴ DOGAMI Open-File Report O-16-02, Landslide Susceptibility Overview Map of Oregon;
http://www.oregongeology.org/pubs/ofr/O-16-02_report.pdf

History - Landslides

December 2006 through January 2007, Gilliam County was one of 27 counties in Oregon that was declared a disaster by FEMA due to landslides caused by severe weather events. Each of the storm events produced record rainfall resulting in landslides. The storms and landslides caused damage to infrastructure and natural resources. FEMA declared this area a disaster on March 20, 2006 (DR -1632). Additional landslides occur but have not been documented.

Probability and Vulnerability

The Gilliam County Natural Hazards Mitigation Plan Steering Committee determined County probability for a winter storm event is **high**, while County vulnerability for a winter storm is also **high**.

Landslides are more likely to happen in the general areas where landslides have occurred in the past, during heavy rainfall events, or a future earthquake.

The OCCRI report (Appendix G) identifies that the risk of cold waves is decreasing for Gilliam County. Cold extremes are still expected to occur from time to time, but with much less frequency and intensity as the climate warms. The frequency of days at or below freezing is projected to decline on average by 7 days by the 2050s. Additionally, the frequency of days with at least 3/4" of precipitation and the frequency of days exceeding a threshold for landslide risk is not projected to change substantially. Overall,

The most likely impact of snow and ice events on Gilliam County are road closures limiting access/ egress to/from some locations, especially roads to higher elevations. Winter storms with heavy wet snow or high winds and ice storms may also result in power outages from downed transmission lines and/or poles. Heavy hail has been known to damage structures as well. Winter storms which bring snow, ice and high winds can cause significant impacts on life and property. Deaths related to winter storms can occur as a result of traffic accidents on icy roads, and hypothermia from prolonged exposure to the cold. Low temperatures and temporary loss of home heating can be particularly hard on the elderly, young children and other vulnerable individuals. In the rural areas of Oregon severe winter storms can isolate small communities, farms, and ranches. Transportation infrastructure is particularly vulnerable to landslide hazards. If Gilliam County's population decreases as predicted, especially in the unincorporated areas, risk will decrease. There have been no new developments in the past five years that have increased the county's landslide and winter storm events. New developments should be built with transportation routes in mind, and should be easily accessed even during snowstorms.

Extreme Weather

Characteristics

Gilliam County experiences extreme weather in the form of extreme heat, extreme cold and summer thunderstorms/hail events.

Extreme temperatures are common throughout all of Gilliam County and the frequency of prolonged periods of high temperature has increased. Hot days are defined as days at or above 90 degrees. Cold days are defined as days at or below freezing. Extreme temperatures in this region are well known, with residents being prepared for extreme cold or extreme heat events annually. The State of Oregon has seen an increase in extreme heat events over the past several years, declaring a State of Emergency for extreme heat 4 times since 2020.

Extreme summer thunderstorms and hailstorms are infrequent, but can produce hailstones from one half to one inch in diameter as well as flash flooding due to intense short duration rains. These storms can cause significant property damage and negatively impact agriculture through crop loss.

Location/Extent

All of Gilliam County is subjected to a extreme weather, particularly extreme heat and extreme cold. Summer thunderstorms/hailstorms, while possible throughout the county are more frequent in the Southern half, impacting Condon and Lonerock more often than Arlington.

History

Table 2.18 identifies significant extreme weather events in Gilliam County, including "state of emergency for extreme heat." Extreme cold snaps have not been recorded as frequently as extreme heat, as they often accompany winter storms with snow. Extreme summer thunderstorms/hailstorms are infrequent, but can have significant impact.

Table 2.18 Extreme Weather Historic Events

Date	Location	Description
April 12, 1957	Southeast Gilliam County	Varied path tornado that covered 15-20 miles. Storm was accompanied by hailstones less than one-half inch in diameter up to over one inch.
July 10-14, 2002	Gilliam, Sherman, Wheeler and a total of 16 counties	A record-breaking heat wave shattered many daily record high temperatures across the state, with a few locations breaking all-time records
August 2003	City of Condon	Severe thunderstorm that produced flash flooding with 1.12 inches of rain in 15 minutes.
June 24-26, 2006	Gilliam, Sherman, Morrow, and a total of 19 counties	A broad upper ridge of unusually high height coupled with a thermally induced surface trough of low pressure produced record-breaking daily high temperatures for several cities in Oregon.
July 20-24, 2006	Gilliam, Sherman, Morrow, and a total of 23 counties.	An unusually strong ridge of high pressure brought several days of record breaking hot and humid weather to NW Oregon. Daily maximum temperatures between 100° and 113° were observed at lower elevations, with temperatures between 90° to 100° at elevations up to 4000 feet. Several people were treated for heat related illness.
June 28-30, 2008	Gilliam, Sherman, Morrow and a total of 20 counties.	An upper-level ridge and thermal trough across the Pacific Northwest produced temperatures above 100 degrees for two consecutive days breaking records in many locations. 2 people died of heat-related illness.
August 15-17, 2008	Gilliam, Sherman, Morrow and a total of 16 counties.	Excessive Heat Event: An upper-level ridge and dry air brought excessive heat into eastern Oregon. Many locations experienced multiple days of at least 100-degree temperatures.
July 25-26, 2010	Gilliam, Sherman, Morrow and a total of 16 counties.	Excessive Heat Event: Temperatures topped 100 degrees for two successive days in Hermiston, Pendleton, 5 miles northeast of Pendleton, Lone, Echo, Arlington, and Umatilla.
August 1, 2011	Gilliam, Sherman Morrow and a total of 6 counties.	A dry, westerly flow aloft under a broad upper-level high pressure system combined with a surface thermal trough to bring several days of temperatures in the 90s.
July 28-31, 2020	Eastern Columbia River Gorge	An upper-level ridge over the region resulted in very hot temperatures and many record highs. Temperatures exceeded 105° in many locations. High temperatures peaked at 108° on the afternoon of Jul 30.
June 25-26 2021	Gilliam and a total of 22 counties.	Determination of State of Emergency in 22 counties due to excessive high temperatures causing a threat to life, health, and infrastructure.
2021	Statewide	Determination of State of Emergency in Oregon due to excessive high temperatures causing a threat to life, health, and infrastructure.
July 25-31, 2022	Eastern Columbia River Gorge	A potent upper-level ridge of high pressure moved over the region and persisted. Multiple areas in the lower elevations reached critical thresholds for heat risk.
August 24-30, 2022	Eastern Columbia River Gorge	The eastern Columbia River Gorge maintained hot afternoon temperatures during this period, resulting in exceeded heat risk thresholds.
2021	Statewide	Determination of State of Emergency in Oregon (2021-37) due to severe winter weather that includes snow accumulation and sustained temperatures below freezing across the state.
2022	Gilliam and a total of 25 counties.	Determination of a State of Emergency (2022-13) due to excessive high temperatures causing a threat to life, health, and infrastructure.

Source: Ibid

Probability and Vulnerability

The Gilliam County Natural Hazards Mitigation Plan Steering Committee determined County probability for extreme weather is **high**, while County vulnerability for a extreme weather is also **high**.

Weather patterns in the county have historically produced extreme heat and extreme cold. Most county residents are prepared for these extremes, and county infrastructure was constructed with extreme weather in mind. The OCCRI report (Appendix G) identifies that extreme heat events are expected to increase in frequency, duration and intensity due to continued warming temperatures. The frequency of hot days with temperatures at or above 90 degrees is projected to increase on average by 33 days, and the temperature of the hottest day of the year is projected to increase by 8 degrees by the 2050s. Cold extremes are still expected to occur from time to time, but with much less frequency and intensity. The frequency of days at or below freezing is projected to decline on average by 7 days and the temperature of the coldest night of the year is projected to increase by 9 degrees by the 2050s. Additionally, the intensity of extreme precipitation events is expected to increase slightly in the future as the atmosphere warms.

The most likely impact of extreme heat events is risks to agriculture, involving the health and welfare of farmers and other farm workers, crops and livestock. In hotter conditions, crops, livestock and humans require more water. For example, on average, for each degree Fahrenheit increase in temperature, plants use 2.5%-5% more water. High temperature and insufficient water stunt plant growth and cause areas of crops to wither. Due to an agriculture based economy, there could be significant impacts to the local economy if extreme heat resulted in crop failure.

The most likely impact of extreme cold events is hypothermia from prolonged exposure to cold or deaths as a result of traffic accidents on icy roads. Low temperatures and temporary loss of home heating can be particularly hard on the elderly, young children and other vulnerable individuals. Extreme cold can also be difficult on livestock, and late winter cold events during calving or lambing season can result in death of offspring. The most likely impact of hail/summer thunderstorms is damage to structures from heavy hail, flash flooding from heavy rain accompanying storms, all of which can cause significant impacts on life and property.

The predicted decrease in population should decrease Gilliam County's vulnerability, but the increase predicted in the elderly population should be closely monitored, as that can increase overall risk. No new developments have taken place over the past 5 years that are impacted by extreme weather, but future developments, especially public high capacity buildings should be fitted for generators so heat and cool and can be maintained during power outages.

Hazard Probability Summary

Probability is the likelihood of future occurrence within a specified period of time. Gilliam County evaluated the best available probability data to develop the probability scores for each hazard presented below. For the purposes of this plan, the County utilized Oregon Department of Emergency Management Hazard Analysis Methodology definitions to determine hazard probability. The definitions are:

LOW = one incident likely within 75 to 100 years scores between 1 and 3 points
MODERATE = one incident likely within 35 to 75 years scores between 4 and 7 points
HIGH = one incident likely within 10 to 35 years scores between 8 and 10 points

Table 2.19 presents the probability scores for each of the natural hazards present in Gilliam County. As shown in the table, the county identified winter storms, wildfires, droughts and extreme weather as high probabilities. The county identified flood, windstorm, and earthquake with a Moderate probability and volcanic event with a low probability. The previous Probability Assessment, in the 2018 Gilliam County NHMP, identified winter storms, wildfire and drought as high probability.

Table 2.19: Natural Hazard Probability Assessment Summary – Gilliam County

Threat Event/Hazard	Severity	Weight Factor	Subtotal	Probability
Wildfire	10	7	70	High
Winter Storm/Landslide	10	7	70	High
Drought	10	7	70	High
Extreme Weather	10	7	70	High
Floods	8	7	56	High
Earthquakes	6	7	42	Moderate
Windstorms	9	7	63	High
Volcanic Events	1	7	7	Low

Source: Gilliam County NHMP Steering Committee, Updated June 1, 2023.

Community Vulnerability

Community vulnerabilities are an important component of the NHMP risk assessment. For more in-depth information regarding specific community vulnerabilities, reference Volume II, Jurisdictional Addenda and Appendix C: Community Profile. Changes to population, economy, built environment, critical facilities, and infrastructure have not significantly influenced vulnerability in Gilliam County. The population had an annual growth rate of .66%, and new development has complied with the standards of the Oregon Building Code and the County’s development code includes their floodplain ordinance. Data sources for the following community vulnerability information can be found in Appendix C, Community Profile, unless otherwise noted below.

Population

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.³⁵ Of this number, a disproportionate burden is placed upon special needs groups, particularly children, the elderly, the disabled, minorities, and low-income persons. Population vulnerabilities can be reduced or eliminated with proper outreach and community mitigation planning. Several factors that are commonly considered variables in a community’s collective vulnerability to disaster are listed below, followed by Table 2.20 that outlines specific vulnerable populations and general county-wide concerns along with the hazards that are most likely to impact them.³⁶

Vulnerable Populations

One characteristic of disasters is that they can exceed the ability of emergency response agencies to provide assistance promptly. In a major disaster, members of the public may be on their own for several days to weeks in some cases. Individuals may need to go for several days without utilities and food and water sources. Disasters may also isolate individuals by damaging transportation routes. Not all people are able to respond to these conditions appropriately. Many people are in vulnerable populations that may have difficulty following official instructions and taking protective actions. For instance, someone who is developmentally

³⁵ Hazards Workshop Session Summary #16, *Disasters, Diversity, and Equity*, University of Colorado, Boulder (2000).

³⁶ Gilliam County Natural Hazards Mitigation Plan, 2013

disabled or deaf may not be able to hear or understand instructions on sanitation, evacuation routes or shelter locations.

Vulnerable populations are those groups that possess specific characteristics that inhibit their ability to prepare for, respond to, or recover from a disaster. These include elderly and youth populations, transient populations, disabled and mentally ill populations, as well as low income populations. These groups are more heavily impacted because they may lack the necessary knowledge, skills, social support structures, or the mental and physical abilities necessary to take care of themselves. Historically, vulnerable populations present a special challenge to emergency managers and response agencies and they are more likely to be victims of a disaster. Fortunately, many people that fall into one of these categories have families, friends, neighbors, and other caretakers that will be able to assist them. But many of them do not have adequate support and those who do may not be able to rely on it in a major event.

Elderly

According to 2020 Census, persons 65 and older made up 29.9% of the population in Gilliam County. Furthermore, out of the 902 household located in the County, 211 (23.4%) are occupied by individuals 65 or older who live alone. Nationwide, as the baby boomer generation enters their 60's, the senior population is expected to dramatically increase. In Gilliam County there is one assisted living facility, as well as one apartment complex dedicated to independent senior housing.

Assisted Living Facilities:

Summit Springs Assisted Living Facility
133 S. Church Street
Condon, Oregon 97823

Licensed for 38 residents
Facilities: 23 apartments, 6 duplex cabins
Memory Care Unit Facility: 8 beds (separate from main building)

Tourist/Travelers

Travelers along Interstate Highway 84 are particularly vulnerable (historically) to numerous hazards, as are tourists who boat along the John Day River. Tourists are particularly vulnerable to disasters because they are usually unfamiliar with the hazards in the region and because they do not have the knowledge or the materials needed to take care of themselves in a disaster. For example, a typical tourist who is unfamiliar with Gilliam County may have difficulty locating evacuation routes or finding shelters. A light-traveling tourist would also not have their own supply of food, water, flashlights, radios, and other supplies that locals can use to take care of themselves in a disaster. Finally, tourists usually do not have a local support structure of family, friends, and neighbors that most of us rely on. In 2019, Gilliam County received 71,000 person overnight trips and 29,000 person day trips. A quarter of overnight visitors stay in private homes, and another quarter stay in hotels or motels. The remaining half stay in undetermined locations.³⁷ Tourism rates in Gilliam County have remained fairly stable, with a slight increase, over the past ten years.

³⁷ Oregon Travel Impacts; Dean Runyan Associates; 2019; pg 101

<https://industry.traveloregon.com/wp-content/uploads/2020/04/ORImp19.pdf>

Disabled

According to 2021 American Community Survey (ACS) estimates from the U.S. Census Bureau, 642 (33.2%) persons five years of age or older in Gilliam County have some form of a disability (either mental, physical, or sensory).³⁸ Of these, a majority (55.1%) are 75 years or older.

Cognitive disability: According to 2021 ACS estimates, 88 (4.6%) persons five years of age or older had some form of a cognitive disability. Cognitive disabilities are defined as because of a physical, mental, or emotional problem, having difficulty remembering, concentrating or making decisions.³⁹

Physical disability: According to 2021 ACS estimates, 158 (8.2%) persons five years of age or older had some form of a physical disability. Physical disabilities are defined as a condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying.⁴⁰

Sensory disability: According to 2021 ACS estimates, 239 (12.4%) persons five years of age or older had some form of a sensory disability. Sensory disabilities include long-lasting conditions such as blindness, deafness, or a severe vision or hearing impairment.⁴¹

Low-Income

According to 2022 American Community Survey estimates, 12.9% of the total population in Gilliam County has income below the national poverty level. This is approximately 251 Gilliam County residents living in poverty.⁴² Not having sufficient financial resources during and after a disaster can be great disadvantage. Lower income people are more likely to live in mobile homes or other homes that are less able to resist damage from flooding, windstorms, and severe weather. Low-income people also tend to have the greatest difficulty recovering from a disaster.

Table 2.20: Vulnerable Populations in Gilliam County

Gilliam County Vulnerable Populations	Drought	Earthquake	Flood	Winter Storm	Volcanic Event	Wildfire	Windstorm	Extreme Weather
Gilliam County								
Travelers along interstate Highway 84		X		X		X	X	X
Tourists along John Day River and Columbia River			X	X		X	X	X
City of Arlington								
Columbia Hills Manor (senior apartments)				X		X		X
Arlington Childcare Center		X		X		X	X	X
Columbia River MH and RV Park				X		X	X	X
Arlington Grade School		X		X		X		X
Arlington High School		X		X		X		X
Elderly Population		X		X		X	X	X
Arlington Airport RV Park		X		X		X	X	X

³⁸ 2021 American Community Survey 5-year Estimates, Table S1810, U.S. Census Bureau

³⁹ Ibid

⁴⁰ Cornell University. Employment & Disability Institute. Disability Statistics. American Community Survey 2003-2007. "Physical disability."

⁴¹ 2022 American Community Survey 5-year Estimates, Table S1810, U.S. Census Bureau

⁴² 2022 American Community Survey Poverty Status in the last 12 Months, U.S. Census Bureau

Table 2.20: Vulnerable Populations in Gilliam County

Gilliam County Vulnerable Populations	Drought	Earthquake	Flood	Winter Storm	Volcanic Event	Wildfire	Windstorm	Extreme Weather
City of Condon								
Summit Springs Village (Assisted Living Facility)				X		X		X
Summit Springs Village Memory Care Unit (Assisted Living Facility)				X		X		X
Condon Early Learning Center		X		X		X	X	X
Condon Grade School				X		X		X
Condon High School		X		X		X		X
Elderly Population (median age in Condon is 65)	X			X		X		X
City of Lonerock								
Elderly population (median age in Lonerock is 61)	X			X		X		X

Source: Gilliam County NHMP Steering Committee, Updated June 2023

Economy

Gilliam County is highly susceptible to economic disturbance from natural hazards. A substantial amount of the region’s economy is based off of agriculture, recreation, and environmental services that can be severely disrupted by various hazards. In Table 2.21 below, the Gilliam County NHMP Steering Committee identified specific economic issues along with the hazards that most likely impact them.

Table 2.21: Vulnerable Economies in Gilliam County

Gilliam County Economic Assets (Vulnerable Economies)	Drought	Earthquake	Flood	Winter Storm	Volcanic Event	Wildfire	Windstorm	Extreme Weather
Gilliam County								
Chemical Waste Management of the Northwest: Hazardous Waste Facility (Waste Management)		X		X		X	X	X
Columbia Ridge Recycling and Landfill (Waste Management)		X		X		X	X	X
Farms/Ranches (Agricultural Land)	X			X	X	X		X
Wind Farms		X		X				X
Shutler Flat Industrial Park				X		X		X
Mid-Columbia Producers		X				X		X
Solar Farms		X		X				X
City of Arlington								
Port of Arlington Marina and RV Park		X	X	X			X	X
Arlington Mesa and Airport		X		X		X	X	X
City of Condon								
Condon Commercial Historic District		X		X		X		X
Condon Airport				X		X		X

Source: Gilliam County NHMP Steering Committee, Updated June 2023

Environment

Natural capital is essential in sustaining all forms of life and plays an often under represented role in natural hazard community resiliency planning. With four distinct yet mild seasons, a diverse terrain and close proximity to national forests, Gilliam County historically has had to deal with habitual drought, flooding, and wildfires. By identifying potential hazards, temperature and precipitation patterns as well as natural capitals such as key river systems, Gilliam County can focus on key areas to better prepare, mitigate, and increase the resiliency of local communities. Table 2.22 below lists specific and general county-wide and city environmental concerns along with the hazards that are most likely to impact them.

Table 2.22: Vulnerable Environments in Gilliam County

Gilliam County Environmental Assets (Vulnerable Environments)	Drought	Earthquake	Flood	Winter Storm	Volcanic Event	Wildfire	Windstorm	Extreme Weather
Gilliam County								
Burns County Park: Condon						X		
Cottonwood Canyon Recreation Site			X	X		X		
Farms/Ranches (Agricultural Land)	X			X	X	X		
Ground Water	X		X					
J.S. Burress State Park			X			X		
John Day River	X		X	X	X			
Fairgrounds				X	X	X		
City of Arlington								
Earl Snell Memorial Park	X	X	X	X			X	X
China Creek Golf Course	X	X		X		X	X	X
City of Condon								
Condon City Park	X	X		X		X		X
Golf Course	X	X		X		X		X

Source: Gilliam County NHMP Steering Committee June 2023

Land-use and Development

To accommodate growth, communities engaged in mitigation planning should address infrastructure and service needs, specific engineering standards, and building codes. Eliminating or limiting development in hazard prone areas, such as floodplains, can reduce vulnerability to hazards, and the potential loss of life, injury, and property damage. Communities in the process of developing land for housing and industry need to ensure that land-use and protection goals are being met to prevent future risks.⁴³ State law requires that cities and the county jointly manage Urban Growth Areas, delineated by a city’s Urban Growth Boundary (UGB) which

⁴³ State of Oregon Emergency Management Plan, Region 5: Mid-Columbia Regional Profile, February 2012

identifies lands needed to meet population and economic demands for growth within a 20-year period.

Gilliam County has experienced significant development of wind farms, and solar farms, with several more in the planning stages. The region has experienced insignificant residential development. Table 2.23 highlights recent land use and development in the county along with the hazards that are most likely to impact them.

Table 2.23: Vulnerable Land Use & Development in Gilliam County

Gilliam County Land Use and Development Assets (Vulnerable developments and Land Use)	Drought	Earthquake	Flood	Winter Storm	Volcanic Event	Wildfire	Windstorm	Extreme Weather
Gilliam County								
TransCanada Gas Line		X				X		
Cottonwood Canyon State Park			X	X		X		X
Wind Farms		X		X		X		
Solar Farms		X		X		X		X
City of Arlington								
Projected: The Woolery		X		X		X	X	X

Source: Gilliam County NHMP Steering Committee June 2023

Critical Facilities and Infrastructure

Transportation networks, systems for power transmission, and critical facilities such as hospitals and police stations are all vital to the functioning of a county. Due to the fundamental role that infrastructure plays both pre- and post-disaster, it deserves special attention in the context of creating more resilient communities.⁴⁴ Table 2.24 below lists specific and general county-wide and city critical infrastructure and services concerns along with the hazards that are most likely to impact them.

Table 2.24: Vulnerable Critical Infrastructure & Services in Gilliam County

Gilliam County Critical Infrastructure and Facilities	Drought	Earthquake	Flood	Winter Storm	Volcanic Event	Wildfire	Windstorm	Extreme Weather
Gilliam County								
Bridges (Cottonwood, Le Page, Arlington, Olex, Thirtymile, Lonerock, Upper Rock Creek, Willow Creek, **Cottonwood)		X	X	X			X	X
Gilliam County Courthouse/Sheriff's Office: Condon		X		X		X		
Gilliam County Sheriff Arlington Outpost		X	X			X		X
Union Pacific Railroad(s)		X	X			X		X
Utility Lines (Columbia Basin, Pacific Power and Light)		X		X		X	X	X
Telephone Lines				X			X	X
Fiber Optic Cables		X				X		
Highways (19, 206, 97, 74)			X	X		X		

⁴⁴ State of Oregon Emergency Management Plan, Region 5: Mid-Columbia Regional Profile, February 2012

Table 2.24: Vulnerable Critical Infrastructure & Services in Gilliam County

Gilliam County Critical Infrastructure and Facilities	Drought	Earthquake	Flood	Winter Storm	Volcanic Event	Wildfire	Windstorm	Extreme Weather
County Roads				X		X		X
Interstate 84				X		X		X
Gilliam County Fair Grounds				X		X	X	X
Frontier Regional 911				X		X		X
Radio Repeaters		X		X	X	X	X	X
Gronquist Building Offices				X		X		X
BPA Power Stations		X		X		X	X	X
Transportation Facility		X	X	X		X	X	X
ODOT Facilities		X		X		X		X
City of Arlington								
Arlington Elementary School (built 1963)		X		X		X		X
Arlington High School (built in 1952)		X		X		X		X
Arlington Medical Clinic		X	X	X		X		X
City Hall		X		X		X		X
North Gilliam Co. Rural Fire Protection District Station						X		
Wastewater Treatment		X	X	X				X
Water System	X	X	X	X		X		X
Interstate 84 Access Ramps				X		X		X
North Gilliam County Ambulance Hall		X		X		X		X
City of Condon								
Condon Elementary School (built in 2021)		X		X		X		X
Condon High School (built in 1962)		X		X		X		X
City Hall		X		X		X		X
South Gilliam Co. Rural Fire Protection District and EMS Station						X		X
South Gilliam County Health Center		X		X		X		X
Frontier Regional 911		X				X		X
Water System	X	X	X	X				X
Wastewater Treatment		X	X	X				X
City of Lonerock								
Lonerock Community Hall			X	X		X		X
Fire Station/Outpost		X	X			X		X
Water System	X	X	X					X

Source: Gilliam County NHMP Steering Committee, Updated June 2023

Vulnerability Summary

Vulnerability is a measure of the exposure of the built environment to hazards. The exposure of community assets to hazards are 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 assets to each hazard and potential implications are explained in each hazard sub-section.

Vulnerability can be described as the percentage of population and property likely to be affected under an “average” occurrence of the hazard. Gilliam County evaluated the best available vulnerability data to develop the vulnerability scores presented below. For the

purposes of this plan, the County utilized the Oregon Department of Emergency Management Hazard Analysis methodology vulnerability definitions to determine hazard probability. The definitions are:

LOW = less than 1-percent affected scores between 1 and 3 points

MODERATE = between 1 and 10-percent affected scores between 4 and 7 points

HIGH = more than 10-percent affected scores between 8 and 10 points

Table 2.25 presents the vulnerability scores for each of the natural hazards present in Gilliam County. As shown in the table, Gilliam County is most vulnerable to wildfire and winter storms, but also identified drought and extreme weather as high vulnerability. Furthermore, the County identified the following hazards with Moderate vulnerability; flood, earthquake, and windstorm. Finally, the County identified volcanic events hazards as low vulnerability. For comparison it is interesting to note that in the 2018 vulnerability assessment, the County ranked winter storm as the only high vulnerability hazard, with earthquakes and windstorms being low vulnerability hazards.

Table 2.25: Vulnerability Scores

Threat Event/Hazard	Severity	Weight Factor	Subtotal	Vulnerability
Wildfire	10	5	50	High
Winter Storm/Landslide	10	5	50	High
Drought	8	5	40	High
Extreme Weather	8	5	40	High
Floods	6	5	30	Moderate
Earthquakes	4	5	20	Moderate
Windstorms	4	5	20	Moderate
Volcanic Events	3	5	15	Low

Source: Gilliam County NHMP Steering Committee, Updated June 2023

Risk Assessment

The Gilliam County NHMP Steering Committee updated the county hazard analysis matrix at a steering committee meeting held on June 01, 2023. Table 2.26 presents the entire updated hazard analysis matrix for Gilliam County. The hazards are listed in rank order from high to low. The table shows that hazard scores are influenced by each of the four categories combined. For local governments, conducting the hazard analysis is a useful step in planning for hazard mitigation, response, and recovery. The method provides the jurisdiction with sense of hazard rank and thus priorities, but does not predict the occurrence of a particular hazard.

With considerations for past historic events, the probability or likelihood of a particular hazard event occurring, the vulnerability to the community, and the maximum threat or worst case scenario, wildfire and winter storm tied as the top hazard threats to the county. Drought and extreme weather were the next two highest ranked hazards, while flood, earthquakes, windstorms and volcanic events make-up the lowest ranked hazards in the matrix. While droughts appear to occur more frequently and have a higher probability of occurring in the future, the impacts are not as potentially dangerous as wildfire and flood events. Overall, taking into account the relative probability or likelihood of a particular hazard event occurring, the potential for injuries or death, the physical impact to facilities as well as economic, ecologic, and social interruptions within the County, both the wildfire and winter storms rank higher than drought.

One would think that hazards with a more prominent history and a higher likelihood of occurring in the future should be ranked high. However, if such hazards do not have a high threat or vulnerability, the score will not change much. For example, the data indicates that windstorms occur more frequently in the County and have a higher probability of occurring in the future compared to an earthquake event hazard. However, since Gilliam County is potentially more vulnerable to earthquake events, especially in a worst case scenario event, the overall threat score for earthquake event is greater than that of windstorm. The hazard scores are influenced by not one or two of the categories but all four combined.

Table 2.26: Hazard Analysis Matrix – Gilliam County

Hazard	History	Probability	Vulnerability	Maximum Threat	Total	Rank	Risk Level
Wildfire	10	10	10	10	240	1	High
Winter Storms/ Landslides	10	10	10	10	240	1	High
Drought	10	10	8	10	230	2	High
Extreme Weather	8	10	8	10	226	3	High
Floods	7	8	6	7	170	4	Moderate
Earthquakes	2	6	4	10	166	5	Moderate
Windstorms	5	9	4	6	153	6	Moderate
Volcanic Events	1	1	3	8	104	7	Low

Source: Gilliam County Steering Committee, June 2023

Multi-Jurisdictional Risk Assessment

Multi-jurisdictional Risk Assessment - §201.6(c) (2) (iii): *“For multi-jurisdictional plans, the risk assessment must assess each jurisdiction’s risks where they vary from the risks facing the entire planning area.”*

The three incorporated cities in Gilliam County; Arlington, Condon, and Lonerock, each held local steering committee meetings and completed a hazard analysis to compare to the assessment completed by the Gilliam County NHMP Steering Committee. The multi-jurisdictional risk assessment information is located within the Risk Assessment section of each jurisdiction’s addendum, which is in Volume II of this NHMP.

SECTION 3: MITIGATION STRATEGY

This section outlines Gilliam County's strategy to reduce or avoid long-term vulnerabilities to the identified hazards. Specifically, this section presents a mission and specific goals and actions, thereby addressing the mitigation strategy requirements contained in 44 CFR 201.6(c). The Natural Hazards Mitigation Plan Steering Committee reviewed and updated the goals and action items documented in this plan. Additional planning process documentation is in Appendix B Planning and Public Process.

Methods

The Gilliam County Natural Hazards Mitigation Steering Committee as well as stakeholders established Gilliam County's mitigation goals and action items. The goals are based on the goals established by the State of Oregon 2020 Natural Hazards Mitigation Plan as well as individual goals set by the 2024 Steering Committee.

Mitigation Plan Goals

The plan goals help guide the direction of future activities aimed at reducing risk and preventing loss from natural hazards. Goals are designed to drive actions and they are intended to represent the general end toward which the County effort is directed. Goals identify how the County intends to work toward mitigating risk from natural hazards. The Cities of Arlington, Condon, and Lonerock agreed to these goals as well. The goals are guiding principles for the specific recommendations that are outlined in the action items. The goals listed here serve as checkpoints as agencies and organizations begin implementing mitigation action items. Goals 1-3 were included in the 2018 NHMP, Goal 4 was added in 2024 to reflect the County's updated priority of enhancing communication, collaboration and coordination at all levels of mitigation.

Goal 1: Safety of life and the preservation of property.

Goal 2: Increased cooperation and collaboration between groups and agencies.

Goal 3: Motivate the whole community; public, private sector, and government agencies to mitigate against the effects of natural hazards through information and education.

Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations and the private sector to mitigate natural hazards.

Existing Mitigation Activities

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 participating jurisdictions better understand risk and can assist in documenting successes. Listed below are mitigation action

items identified in the previous version of the Gilliam County NHMP that are in progress or have been completed with further activities to occur identified in Appendix A, Action Item Forms. The following descriptions comprise the status update of the 2018 mitigation actions.

Table 3.1 lists mitigation actions that are being carried forward in the 2024 NHMP, including both previous and newly created actions.

2018/2024 Multi-Hazard Action Item #1 – *Provide public information regarding natural hazards via website posting, social media, newsletter, mailings and distributed flyers.*

- Ongoing: The Gilliam County Emergency Manager annually supplies natural hazard brochures throughout various locations in Gilliam County, including at major events such as the Gilliam County Fair.
- These activities help mitigate the effects from drought, wildfire, windstorm, extreme weather, flooding, earthquake and winter storm/landslide hazard events.
- The brochures are intended to motivate the public, private sector, and government agencies to mitigate against and prepare for the effects of natural hazards.

2018/2024 Multi-Hazard Action Item #2 – *Seek funding for the implementation of priority projects that reduce the vulnerability of critical public facilities in Gilliam County.*

- Ongoing: Funding has been received for several projects and is consistently being sought after by different public and government agencies for mitigation.
- Funding was received for wildfire mitigation from Oregon State Fire Marshal for county wide projects and a part-time staff member to complete projects.
- Funding was received to update the Gilliam County Fair Grounds, used as an all-purpose Community Resilience Center and hazard response staging area.

2018/2024 Multi-Hazard Action Item #3 – *Develop and maintain a comprehensive impact database on severe natural hazard events in Gilliam County.*

- Ongoing: The Gilliam County Emergency Manager maintains a database of all state and federally declared disasters, significant wildfires, and County declared droughts.

2018/2024 Multi-Hazard Action Item #4 - *Seek funding for generators and satellite telephones for critical facilities.*

- Ongoing: Funding was received to install generators at different facilities. This action item was updated for the 2024 NHMP by listing out specific critical facilities that need generators.
- A generator was installed in the new South Gilliam County Fire Hall built in 2012.
- Funding was received to install a generator at the Gilliam County Fair Grounds, used as an all-purpose Community Resilience Center and hazard response staging area.
- A generator was installed at the waste water plant in Condon in 2016.

¹ Gilliam County Natural Hazards Mitigation Plan, 2013

2018/2024 Earthquake Action Item #1 - Seek funding through the Oregon Department of Emergency Management and/or the Federal Emergency Management Agency to seismically retrofit critical facilities with either a very high or high collapse potential rate by the Department of Geology and Mineral Industries.

- Ongoing: One building has been replaced, and there are plans to update the other high and very high collapse potential buildings.
- The Condon Grade School was listed as a very high collapse potential and has been replaced with a new building.

2018/2024 Flood Action Item #1 - Coordinate with the State Floodplain coordinator and the Department of Land Conservation and Development to obtain updated floodplain information for Gilliam County and the incorporated cities.

- Ongoing: DLCD and FEMA are currently updating the floodplain maps for Gilliam County.

2018 Flood Action Item #2 - Maintain and upgrade Lonerock Bridge, remove willows from creek bed and replace current bridge with free standing bridge.

- Complete: The Lonerock bridge was replaced in 2021.

2018/2024 Winter Storm City of Arlington Action item #1 - Conduct public outreach to residents regarding sidewalk maintenance during freezing rain events.

- Ongoing: The City of Arlington regularly conducts this outreach in the winter, through information at City Council Meetings and social media posts.

2018/2024 Winter Storm City of Condon Action item #1 -Conduct Public outreach and notification about protecting pipes during extreme cold periods.

- Ongoing: The City of Condon regularly conducts this outreach in the winter, through information at City Council Meetings and social media posts.

2018/2024 Winter Storm City of Condon Action item #2 - Seek funding for more snow removal equipment.

- Ongoing: The City of Condon was able to purchase one new snow plow, but needs to find funding for another one to provide reliable service to City Residents.

2018 Winter Storm City of Lonerock Action Item #1 - Pave the "grade" Lonerock Road to reduce icy conditions and accidents in the winter.

- Completed: The grade was paved in 2021.

2018 Wildfire Mitigation Action Item #1 - Provide Gilliam County Road Department with Fire Fighting Training and equipment.

- Ongoing: The Gilliam County Road Department uses equipment such as road graders to fight fires, and due to staff turnover consistently requires basic fire fighting training.

2018/2024 Wildfire Action Item #2 - Create firebreaks around vulnerable facilities through fire resistant plants.

- Ongoing: The Soil and Water Conservation District conducted testing of forage kochia for a vegetative fire break in different locations in the county. The test strips were moderately successful.
- This action item was updated for the 2024 NHMP to include other methods of fuel breaks, including installed gravel/hardscaping or vegetation management methods, such as mowing, spraying or discing.

2018/2024 City of Arlington Wildfire Action Item #1 - Reduce wildfire load through weed abatement projects and fire breaks.

- Ongoing: The City of Arlington annually reduces fuel loads through weed abatement projects and fuel breaks round critical facilities such as the water towers and wastewater treatment plant.
- In 2023 the City received funding through the Oregon State Fire Marshal's Community Wildfire Risk Reduction Grant to implement a prescribed grazing cost share program, fund micro-grants for citizens to conduct vegetation management on their own property, fund community clean up days and begin a tool inventory program for citizens to borrow vegetation management tools. The funding will last until March 2026.

2018/2024 City of Lonerock Wildfire Action Item #1 - Weed abatement; decrease wildfire risk through maintenance of yard and roadside vegetation.

- Ongoing: The Citizens of Lonerock annually maintain their yards and roadside vegetation.
- In 2023, Gilliam County Fire Services received funding through the Oregon State Fire Marshal's Community Wildfire Risk Reduction Grant to fund Wildfire Preparation/Community Clean Up Days in the City of Lonerock.

The information provided in Volume I, Section 2: *Risk Assessment* is to provide the basis and justification for the mitigation actions identified in this plan. This section, Section 3 Mitigation Strategy, describes the components that guide implementation of the identified mitigation strategies and is based on strategic planning principles. This section provides information on the process used to develop a mission, goals and mitigation action items. The action items are detailed recommendations for activities that local departments, citizens and others could engage in to reduce risk. This section also includes an explanation of how the County intends to incorporate the mitigation strategies outlined in the plan into existing planning mechanisms and programs such as the County comprehensive land use planning process, capital improvement planning process, and building codes enforcement and implementation.

Current Mitigation Plan Action Items

Action items for the County and participating cities are listed in Table 3.1. Short and long-term action items identified through the planning process are an important part of the mitigation plan. Mitigation action items 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. Action items can be developed through a number of sources. The figure below illustrates some of these sources. A description of how the plan’s mitigation actions were developed for the original 2007 NHMP is provided below. 2007 actions were reviewed by the 2013 NHMP Steering Committee and several new actions were developed. Subsequent action items for the 2018 update were developed by the 2018 Steering Committee; the group also reviewed and updated the 2013 actions. Action items for the 2024 update were developed by the Steering Committee; who also reviewed the 2018 Action items. The 2024 Steering Committee reviewed community survey results to assist with developing mitigation action items, and also used the Community Wildfire Protection Plan updated in 2022 to develop action items.

Figure 3.1 Action Item Sources



Priority Actions

Action items identified through the planning process are an important part of the mitigation plan. Action items are detailed recommendations for activities that local departments, citizens, and others could engage in to reduce risk. For the 2024 update Gilliam County and participating cities made a list of all actions they would like to focus on in the next five years, and identified the action items that were highest priority. This plan identifies priority actions based on an evaluation of high impact hazards, resource availability, and FEMA identified best practices. The actions were chosen by steering committee members using a modified STAPLEE process. For the initial project prioritization, qualitative methods were used to determine priority, including quality of life, natural and beneficial values, including actions that could benefit long term risk including climate change, and which actions would provide the benefit to the largest number of people, specifically focusing on socially vulnerable communities. During the plan

implementation and maintenance phase action item prioritization may and most likely will be modified and the Steering Committee is planning on using the process identified in Volume I, Section 4 Plan Implementation and Maintenance, Project Prioritization Process. It is important prior to any implementation of action items that the cost-versus benefit are weighed, and the cost of the action is measured against the benefit of the action. Gilliam County will focus on prioritizing actions with more benefits than other alternatives. It was noted that for this update, the increased impact of recent wildfires statewide has increased the priority of wildfire mitigation overall, and there are significantly more wildfire actions, and wildfire priority actions in this update than previous versions of the NHMP. See Table 3.1 for a list of County and City action items (high priority mitigation actions as of 2024 for the County are shown in bold text). Priority actions for each city are listed in Table 3.2 and within Volume III.

Action Item Worksheets

Each action item listed in Table 3.1 has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, assigning coordinating and partner organizations, noting if it benefits vulnerable communities, if it helps mitigation long-term risks including climate change and listing specific funding sources. Jurisdictions to which an action item applies are listed in Table 3.1. The action item worksheets can assist the community in pre-packaging potential projects for grant funding, and it can assist the Steering Committee with Annual Project Prioritization. The worksheet components are described below. These action item worksheets are located in Appendix A.

Rationale or Key Issues Addressed

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items 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 action items is based on the information documented in Section 2, Risk Assessment and the Oregon NHMP's Region 5: Regional Profile and Risk Assessment.²

Plan Goals Addressed

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

Ideas for Implementation

The ideas for implementation offer a transition from theory to practice and serve as a starting point for this plan. This component of the action item is dynamic, since some ideas may prove to not be feasible, and new ideas may be added during the plan maintenance process. Ideas for implementation include such things as collaboration with relevant organizations, grant programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure.

² State of Oregon Natural Hazard Mitigation Plan, NHMP Region 5: Mid-Columbia, 2020.

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.

Internal and External Partners

The internal and external partner organizations listed in the Action Item Worksheets are potential partners recommended by the project 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 action items.

Internal partner organizations are departments within the County or other participating jurisdiction that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.

External partner organizations can assist the coordinating organization in implementing the action items in various functions and may include local, regional, state, or federal agencies, as well as local and regional public and private sector organizations.

Does the alleviate long-term risk from future conditions, including climate change?

If the action alleviates long-term risk from future conditions, including climate change is an important questions for Steering Committee members to ask themselves when prioritizing hazard mitigation items in this plan. While an action doesn't have to always mitigate long term risk, when prioritizing which projects to complete or conducting a cost-benefit analysis, if an action has long-term impacts can assist with decision making. It is also important to keep long-term risks in mind when formulating mitigation action items.

Potential Funding Sources

Specific funding sources for each mitigation action item are included in the Action Item Forms. In some instances there are multiple funding streams, including Federal Grants, State Grants, County Funds or City Funds. This is not an exhaustive list of all possible funding sources, but should give the coordinating organization a good place to begin looking for funding.

Timeline

Action items include short, long-term and ongoing activities. Each action item includes an estimate of the timeline for implementation.

Ongoing actions items are activities that are currently in process and will continue to be implemented during the next planning period. Some portion of this action item may be completed, with other progress planned. When available, information regarding the schedule of implementation has been included (annually, quarterly, etc.).

Short-term action items are activities that may be implemented with existing resources and authorities in one to two years.

Long-term action items may require new or additional resources and/or authorities, and may take from two to five years to implement.

Hazard Key

For the purposes of this plan, the following abbreviations are used to refer to hazards:

- MH = Multi-Hazard
- DR = Drought Hazard
- FL = Flood Hazard
- EQ = Earthquake Hazard
- EW= Extreme Weather
- VE = Volcanic Event
- WF = Wildfire
- WD = Windstorm
- WS = Winter Storm (includes landslides)

Multi-Hazard actions relate to all natural hazards identified in the NHMP, even if the hazards do not have a specific mitigation action.

Implementation through Existing Programs

The Gilliam County multi-jurisdictional Natural Hazards Mitigation Plan includes a range of action items that, when implemented, will reduce loss from hazard events in the County. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Gilliam County currently addresses statewide planning goals and legislative requirements through its comprehensive land use plan, capital improvement plan, mandated standards and building codes. To the extent possible, Gilliam County and the participating jurisdictions will work to incorporate the recommended mitigation action items into existing programs and procedures. A complete list of Gilliam County Plans, Mandated Standards and building codes that Gilliam County can use to support this NHMP, and how the NHMP will be integrated with their planning process is included in Appendix C, Community Profile Starting on page C-44.

Many of the Gilliam County multi-jurisdictional Natural Hazards Mitigation Plan's recommendations are consistent with the goals and objectives of the County's existing plans and policies. Where possible, Gilliam County will implement the recommended actions of the multi-jurisdictional Natural Hazard Mitigation Plan through existing plans and policies. 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.³ Implementing the Natural Hazards Mitigation Plan's action items through such plans and policies increases their likelihood of being supported and implemented. Additionally, when these plans are updated the Gilliam County multi-jurisdictional Natural Hazards Mitigation Plan should be used as a reference document to help guide the planning process with regards to hazard mitigation.

³ Burby, Raymond J., ed. 1998. Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities.

Table 3.1: 2024 Action Items: Gilliam County

Action Item	Action Item Title	Coordinating Organization	Partner Organizations	Timeline	Potential Funding Source*	Goal 1	Goal 2	Goal 3	Goal 4	County	Arlington	Condon	Lonerock
MH #1 Priority	Provide public information regarding natural hazards via website posting, social media, newsletter, mailings, and distributed flyers.	Gilliam County Emergency Management	Cities of Arlington, Condon, Lonerock; NGRFPD, SGRFPD, Oregon Watermaster District 21, OSU EX, FSA, NRCS, GCFS, OSFM, ODEM	Ongoing Once a quarter	Local Sources	X	X	X	X	X	X	X	X
MH #2 Priority	Seek funding for the implementation of priority projects that reduce the vulnerability of critical public facilities in Gilliam County	Gilliam County Emergency management	Cities of Arlington, Condon and Lonerock; GC, NHMP Steering Committee, DOGAMI, ODEM, FEMA, OSFM	Long-term	Local, State or Federal Funding	X	X			X	X	X	X
MH #3	Develop and maintain a comprehensive impact database on severe natural hazard events in Gilliam County	Gilliam County Emergency Management	Cities of Arlington, Condon and Lonerock, GC Planning, Public Utilities, Oregon Watermaster District 21, OSU EX, FSA, NWS, NRCS	Ongoing (as needed)	Local Sources	X	X			X	X	X	X
MH #4 Priority	Seek funding for backup generators for critical facilities including Arlington Clinic, North Gilliam County Emergency Medical Services, Arlington Middle School, Arlington High School, Arlington City Hall, Arlington Water Pumping Station, Gilliam County Fair Grounds and Lonerock Community Center.	Gilliam County Emergency management	Cities of Arlington, Condon and Lonerock; Public Utilities; ODEM	Long Term	Federal and State Grants	X	X			X	X	X	X
MH #5 Priority	Work with ODEM to establish a 2 Weeks ready program in Gilliam County.	Gilliam County Emergency Management	ODEM; NGRFPD, SGRFPD; Cities of Arlington, Condon and Lonerock; OSFM OSU EX	Short Term	Local and State Funding	X	X	X		X	X	X	X
MH #6 Priority	Increase number of people signed up for Frontier 911 Alerts	Gilliam County Emergency Management	Cities of Arlington, Condon and Lonerock. NGRFPD, SGRFPD, GCFS, GCSO, Frontier 911, Everbridge Alerts	Ongoing, Short Term	Local Sources	X	X	X	X	X	X	X	X
MH #7	Work with critical businesses for backup power and internet, including gas stations and grocery stores.	Gilliam County Emergency Management	City of Arlington, Condon and Lonerock. Critical businesses including gas stations and grocery stores in Arlington and Condon. Port of Arlington	Long Term	State and Federal Funding, Partner Agencies	X				X	X	X	X
MH #8	Install purchased HAM Radio Repeater at the Condon Radar Base/Richmond Road Community	Richmond Road Community	City of Condon, GC, OSU EX	Short Term	Local Sources	X	X		X	X	X	X	X

Action Item	Action Item Title	Coordinating Organization	Partner Organizations	Timeline	Potential Funding Source*	Goal 1	Goal 2	Goal 3	Goal 4	County	Arlington	Condon	Lonerock
MH #9 Priority	Obtain radios for public works to better communicate with the Road Department, Fire Protection Districts and ODOT during hazardous situations.	Gilliam County Emergency Management	Cities of Arlington and Condon, Public Works, GCRD, ODOT, OSFM	Short Term	State and Federal Funding	X	X		X	X	X	X	X
MH #10 Priority	Establish the Gilliam County Fair Grounds in Condon as a multi-purpose Community Resilience Center to Provide shelter and resources during fire, climate, and other emergencies. Install backup generators to power buildings with emergency shelter capabilities, air filtration systems and air conditioning systems.	Gilliam County Emergency Management	GC Fair Board, City of Condon, SGRFPD, SGEMS, GCFS, ODEM, FEMA, ODHS, OSFM, GCPH	Long Term	State and Federal Funding	X	X			X	X	X	X
MH #11	Establish a multipurpose Community Resilience Center in Arlington to provide shelter and resources during fire, climate, and other emergencies. Install back-up generators to power buildings with emergency shelter capabilities, air filtration systems and air conditioning systems.	Gilliam County Emergency Management	City of Arlington, NGRFPD, GCFS, NGEMS, ODEM, FEMA, ODHS, OSFM, GCPH	Long Term	State and Federal Funding	X	X			X	X		
MH #12 Priority	City of Lonerock: Install a generator at Lonerock Community center for a resilience center to provide shelter and resources during climate and other emergencies.	Gilliam County Emergency Management	City of Lonerock: SGRFPD, SGEMS, GCFS, ODEM, FEMA, ODHS, OSFM, GCPH	Long Term	State and Federal Funding	X	X			X			X
D #1	Improve long range water sources; increase storage through deeper wells.	City of Condon	GCEM, Oregon Watermaster District 21; SWCD, GCPH	Long Term	State and Federal Funding	X				X		X	
D #2 Priority	Conduct public outreach on water use and water saving techniques during periods of drought, including businesses and private individuals.	Gilliam County Emergency Management	Cities of Arlington, Condon and Lonerock, GCPH, FEMA, ODEM, SWCD, NRCS, USDA, OSU EX	Ongoing	Local Sources	X		X	X	X	X	X	X

Action Item	Action Item Title	Coordinating Organization	Partner Organizations	Timeline	Potential Funding Source*	Goal 1	Goal 2	Goal 3	Goal 4	County	Arlington	Condon	Lonerock
DR #3	Conduct a groundwater assessment for Condon	City of Condon	GCEM, SWCD, NRCS, ODEM, OSU EX, ODEQ	Long Term	Local, Federal and State Funding	X	X			X		X	
DR #4 Priority	Update the City of Condon's water supply, including installing a new water transmission line from City Farm (well location) to the City of Condon and a new telemetry system.	City of Condon	GCEM, SWCD, Oregon Watermaster District 21, GCPH, ODHS	Long Term	Local, State and Federal Funding	X				X		X	
EQ #1 Priority	Seek funding through the Oregon Department of Emergency Management and/or the Federal Emergency Management Agency to seismically retrofit critical facilities with either a very high or high collapse potential rate by the Department of Geology and Mineral Industries.	Gilliam County Planning Department	Cities of Arlington, Condon and Lonerock; School Districts (SD 3, SD25J); GCEM, ODEM, FEMA, DOGAMI	Long Term	State Funding	X	X			X	X	X	X
EQ #2	Increase public outreach for earthquake education	Gilliam County Emergency Management	City of Arlington, Condon and Lonerock, Arlington and Condon Schools, GC Planning, FEMA, ODEM, DOGAMI	Ongoing	Local Sources	X		X		X	X	X	X
EQ #3	Seismically retrofit critical facilities not included in the DOGAMI 2006 assessment: Arlington Medical Clinic, South Gilliam Health Center, Arlington City Hall, Gilliam County Road Department Building, Arlington Childcare Center, and Condon Childcare Center.	Gilliam County Planning Department	Cities of Arlington and Condon. GCEM, Arlington Medical Clinic, South Gilliam Health Center, GCRD, Arlington and Condon Childcare Centers, ODEM, FEMA, DOGAMI	Long Term	State and Federal Funding	X		X		X	X	X	X
FL #1 Priority	Work with the State Floodplain Manager at the Department of Land Conservation and Development (DLCD) to obtain updated floodplain information for Gilliam County and its incorporated Cities.	Gilliam County Emergency Management	Gilliam County; Cities of Arlington, Condon and Lonerock, DLCD, DOGAMI, FEMA	Ongoing; FEMA and DLCD are currently updating	State and Federal Funding	X	X		X	X	X	X	X

Action Item	Action Item Title	Coordinating Organization	Partner Organizations	Timeline	Potential Funding Source*	Goal 1	Goal 2	Goal 3	Goal 4	County	Arlington	Condon	Lonerock
WS #1 Priority	Work with ODOT on traffic patterns for rerouting major routes such as I-84 during winter storms, removing Highways 74 and 206 from I-84 alternate routes.	City of Condon Public Works	Cities of Arlington and Condon, GCEM, GCRD, ODOT	Short Term	Local Sources	X	X		X	X	X	X	X
WS #2 Priority	Conduct outreach throughout the County and incorporated cities about Winter Storm Dangers, including sidewalk maintenance during freezing rain events and protecting pipes during extreme cold periods.	Gilliam County Emergency Management	Cities of Arlington, Condon and Lonerock, GCRD, ODEM	Ongoing	Local Sources	X		X	X	X	X	X	X
WS #3	Upgrade aging snow removal equipment.	City of Condon	GCEM, GCRD	Ongoing	Local and State Funding	X				X		X	
WF #1	Provide Gilliam County Road Department with firefighting training and equipment.	Gilliam County Fire Services	GC, Cities of Arlington, Condon, and Lonerock, NGRFPD, SGRFPD, ODF, OSFM, ODEM, BLM, USFS	Ongoing	Local, State Funding	X	X	X		X	X	X	X
WF #2 Priority	Create firebreaks around vulnerable facilities through fire resistant plants, hardscaping or through vegetation management. Purchase equipment and supplies for establishing fuel breaks, including irrigation type water line, vegetation management equipment.	Gilliam County Fire Services	Cities of Arlington, Condon, and Lonerock, NGRFPD, SGRFPD, GCEM, ODF, OSFM, ODEM, BLM, USFS, NRCS, SWCD	Ongoing	Local, State and Federal Funding	X	X	X		X	X	X	x
WF #3	Work with Day Wireless to ensure weed/vegetation mitigation is performed around critical communication towers.	Gilliam County Emergency Management	GC Weed Department, Day Wireless, OSFM	Short Term	External Partners	X	X	X	X	X	X	X	x
WF #4 Priority	Create a county-wide landowner outreach program to educate and incentivize defensible space best practices, including defensible space around homes, using fire resistant plants in landscaping and other established methods.	Gilliam County Fire Services	Cities of Arlington, Condon and Lonerock, NGRFPD, SGRFPD, GCEM, SWCD, NRCS, OSU EX, OSFM, ODEM,	Ongoing	Local, State and Federal Funding	X	X	X	X	X	X	X	x

Action Item	Action Item Title	Coordinating Organization	Partner Organizations	Timeline	Potential Funding Source*	Goal 1	Goal 2	Goal 3	Goal 4	County	Arlington	Condon	Lonerock
WF #5	Develop a program for prescribed animal grazing in high-risk areas throughout the County, including exploring a cost share option with private landowners.	Gilliam County Fire Services	Cities of Arlington, Condon and Lonerock, NGRFPD, SGRFPD, GCEM, SWCD, NRCS, OSU EX, OSFM, ODEM,	Ongoing	Local Sources, State and Federal Funding	X	X	X		X	X		
WF #6	Develop a fire prevention sign program with important State, Federal and Local partners; including but not limited to Bureau of Land Management, Oregon Parks and Recreation Department, Sherman County, Wheeler County, Travel Oregon, Oregon State Fire Marshal, Oregon Department of Transportation, etc.	Gilliam County Fire Services	Cities of Arlington, Condon and Lonerock, NGRFPD, SGRFPD, GCEM, BLM, OPRD, Sherman County, Wheeler County, Morrow County, Travel Oregon, OSFM, ODOT, OEM	Long Term	Local Sources, State and Federal Funding	X	X	X	X	X	X	X	X
WF#7	Complete a road, culvert, stream crossing and railroad crossing assessment to address existing situations which could result in problems for evacuation of residents and limit fire apparatus during a wildfire response.	Gilliam County Emergency Management	Cities of Arlington, Condon and Lonerock, GCRD, GC Planning Department, NGRFPD, SGRFPD, NGEMS, SGEMS, SWCD, OSFM, OEM, NRCS, ODOT, Union Pacific Railroad, Watco, Waste Management	Long Term	Local Sources, State and Federal Funding	X	X	X		X	X	X	x
WF #8	Assist Rural Fire Protection Districts in upgrading their firefighting equipment to increase wildland firefighting capabilities and capacity.	Gilliam County Fire Services	GCEM, NGRFPD, SGRFPD, OSFM, FEMA	Long Term	Local Sources, State and Federal Funding	X	X			X	X	X	X
WF #9	Promote the use of wildfire and drought resistant around homes and businesses.	Gilliam County Fire Services	Cities of Arlington, Condon and Lonerock, NGRFPD, SGRFPD, GCEM, SWCD, NRCS, OSU EX, OSFM, ODEM	Short Term	Local Sources, State and Federal Funding	X		X		X	X	X	X
WF #10 Priority	Reduce wildfire fuel load through weed abatement projects and fuel/fire breaks in the City of Arlington.	City of Arlington	GCFS, NGRFPD, SWCD, NRCS, OSU EX, OSFM, ODEM	Ongoing	Local, State and Federal Funding	X		X		X	X		

Action Item	Action Item Title	Coordinating Organization	Partner Organizations	Timeline	Potential Funding Source*	Goal 1	Goal 2	Goal 3	Goal 4	County	Arlington	Condon	Lonerock
WF #11 Priority	Conduct weed abatement to reduce wildfire risk through maintenance of yard and roadside vegetation in the City of Lonerock.	City of Lonerock	GCFs, NGRFPD, SWCD, NRCS, OSU EX, OSFM, ODEM	Ongoing	Local Sources, State and Federal Funding	X		X		X			x
EW #1 Priority	Increase outreach and provide assistance to county residents on using the EnergyTrust of Oregon, Columbia Basin, and Pacific Power programs to help with insulation, energy efficient heat pumps and improving their homes resilience to cold and heat.	Gilliam County Emergency Management	Cities of Arlington, Condon and Lonerock, GCPH, GC Senior and Family Services, EnergyTrust of Oregon, Utility Companies, ODEM, ODHS	Short Term	Local Sources, External Partners	X		X		X	X	X	X

Source: Gilliam County NHMP Steering Committee, City of Arlington, Condon, and Lonerock Steering Committees

Priority Actions listed in **bold text**.

Key: *Specific Funding sources are listed in the Mitigation Action Item Forms; GC=Gilliam County; GCEM=Gilliam County Emergency Management; NGRFPD: North Gilliam Rural Fire Protection District; SGRFPD: South Gilliam Rural Fire Protection District; Gilliam County Fire Services: GCFs; OSFM: Oregon State Fire Marshal; ODEM: Oregon Department of Emergency Management; FEMA: Federal Emergency Management Agency; NRCS=Natural Resource Conservation Service; FSA=Farm Service Agency; OSU EX=Oregon State University Extension Service; DOGAMI: Oregon Department of Geology and Mineral Industries; NWS: National Weather Service; GCSO: Gilliam County Sheriff's Office; GCRD,: Gilliam County Road Department

SECTION 4:

PLAN IMPLEMENTATION AND MAINTENANCE

This section details the formal process that will ensure that the Gilliam County multi-jurisdictional Natural Hazards Mitigation Plan 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 producing an updated plan every five years. Finally, this section describes how the County and participating jurisdictions will integrate public participation throughout the plan maintenance and implementation process.

Implementing the Plan

After the Plan is locally reviewed, the Gilliam County Emergency Management Coordinator submits it to the State Hazard Mitigation Officer at the Oregon Department of Emergency Management (OEM), which reviews and then submits the plan to the Federal Emergency Management Agency (FEMA--Region X) for review. These reviews address the federal criteria outlined in the FEMA Interim Final Rule 44 CFR Part 201. Upon receipt of an “Approval Pending Adoption” letter from FEMA via ODEM, the County will adopt the plan via resolution. At that point the County will gain eligibility for the Building Resilient Infrastructure and Communities Grant Program, the Hazard Mitigation Grant Program funds, and Flood Mitigation Assistance program funds. Following County adoption, the participating jurisdictions should adopt the NHMP consistent with their jurisdiction specific information.

Convener

The Emergency Management Department will be responsible for overseeing the implementation and maintenance of the plan. There will be joint conveners from Emergency Management and partners as listed in the Jurisdictional Addenda for jurisdiction specific actions. The Natural Hazards Mitigation Plan Convener will provide the following:

- Steering Committee meeting dates, times, locations, agendas, and member notification;
- Document outcomes of Committee meetings;
- Serve as a communication conduit between the Steering Committee and key plan stakeholders;
- Identify emergency management-related funding sources for natural hazard mitigation projects; and
- Utilize the Risk Assessment as a tool for prioritizing proposed natural hazard risk reduction projects.
- Track status of identified hazard mitigation actions.

Coordinating Body

The Steering Committee will serve as the coordinating body for the mitigation plan and will be responsible for the following tasks:

- Serving as the local evaluation committee for funding programs such as the Building Resilient Infrastructure and Communities Grant Program, the Hazard Mitigation Grant Program funds, and Flood Mitigation Assistance program funds;
- Prioritizing and recommending funding for natural hazard risk reduction projects;
- Documenting successes and lessons learned;
- Evaluating the plan for effectiveness at achieving its stated purpose and goals;
- Evaluating and updating the Natural Hazards Mitigation Plan following a disaster;
- Evaluating and updating the Natural Hazards Mitigation Plan in accordance with the prescribed maintenance schedule; and
- Developing and coordinating ad hoc and/or standing subcommittees as needed.
- Updated Convener on status of mitigation actions.

Members

The following organizations were represented and served on the Steering Committee during the development of the Gilliam County multi-jurisdictional Natural Hazards Mitigation Plan:

- City of Arlington
- City of Condon
- City of Lonerock
- Gilliam County Assessor’s Office
- Gilliam County Emergency Management Department
- Gilliam County Fire Services (North Gilliam and South Gilliam Fire Districts)
- Gilliam County Planning Department
- Gilliam County Road Department
- Gilliam County Sheriff’s Office
- Oregon State Fire Marshal
- Bureau of Land Management
- Oregon State University

To make the coordination and review of Gilliam County multi-jurisdictional Natural Hazards Mitigation Plan as broad and useful as possible, the coordinating body will engage additional stakeholders and other relevant hazard mitigation organizations and agencies to implement the identified action items. Specific organizations have been identified as either internal or external partners on the individual action item forms found in Section 3 – Mitigation Strategy and Appendix A.

Plan Maintenance

Plan maintenance is a critical component of the Natural Hazards Mitigation Plan. Proper maintenance of the plan ensures that this plan will maximize the County’s, Cities’, and special districts’ efforts to reduce the risks posed by natural hazards. The Steering Committee and local staff are responsible for implementing this plan maintenance process, in addition to maintaining and updating the plan through a series of meetings outlined in the maintenance schedule below.

Semi-Annual Meetings

The Committee will meet on a semi-annual basis to complete the following tasks. During the first meeting of each year the Committee will:

- Review existing 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 of the year the Committee will:

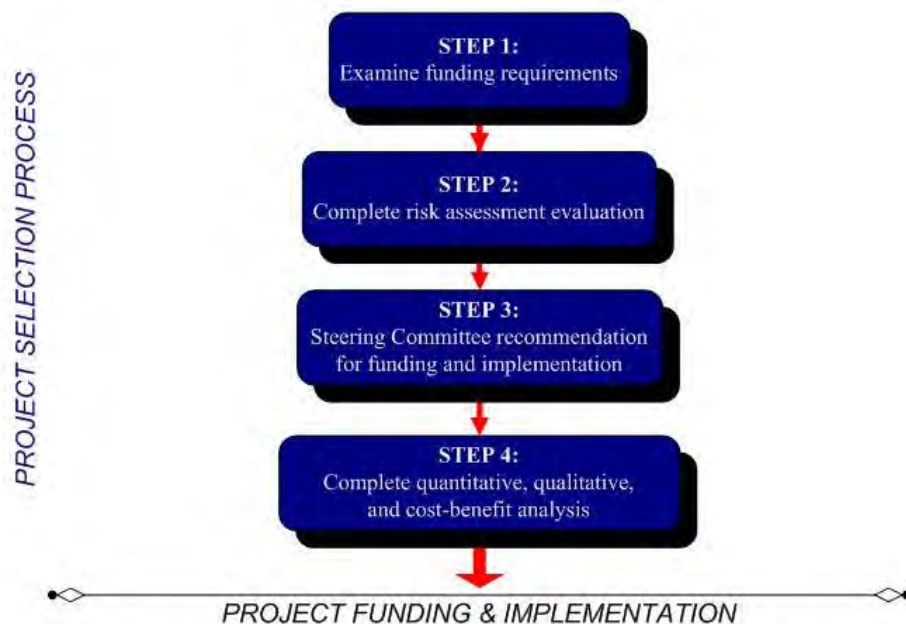
- Review existing and new risk assessment data;
- Discuss methods for continued public involvement; and
- Document successes and lessons learned during the year.

The Gilliam County Emergency Management Department (convener) will be responsible for documenting the outcome of the semi-annual meetings as described in Appendix B Planning and Public Process. The process the Steering Committee (coordinating body) will use to prioritize mitigation projects is detailed in the section below. The plan’s format allows the county and participating jurisdictions to review and update sections when new data becomes available. New data can be easily incorporated, resulting in a NHMP that remains current and relevant to the participating jurisdictions.

Project Prioritization Process

The Disaster Mitigation Act of 2000 requires that jurisdictions identify a process for prioritizing potential mitigation actions. Potential mitigation activities often come from a variety of sources; therefore the project prioritization process needs to be flexible. Mitigation actions and projects may be identified by committee members, local government staff, other planning documents, or the NHMP Risk Assessment. Figure 4.1 illustrates the mitigation actions development and prioritization process. A short list of proposed mitigation actions were prioritized during this plan update. When the actions are reviewed and considered for implementation, the following process may be used to prioritize additional actions:

Figure 4.1: Action Item and Project Prioritization Process



Source: Community Service Center’s Partnership for Disaster Resilience at the University of Oregon, 2008.

Step 1: Examine funding requirements

The first step in prioritizing the plan's action items is to determine which funding sources are open for application. Several funding sources may be appropriate for the county's proposed mitigation projects. Examples of mitigation funding sources include but are not limited to: FEMA's Building Resilient Infrastructure and Communities (BRIC) competitive grant program, Flood Mitigation Assistance (FMA) program, Hazard Mitigation Grant Program (HMGP), Community Wildfire Defense Grants (CWDG), Community Development Block Grants (CDBG), local general funds, and private foundations, among others. Please see Volume III, Appendix F: Grant Programs for a more comprehensive list of potential grant programs.

Because grant programs open and close on differing schedules, the coordinating body will examine upcoming funding streams' requirements to determine which mitigation activities would be eligible. The coordinating body may consult with the funding entity, Oregon Department of Emergency Management, or other appropriate state or regional organizations about project eligibility requirements. This examination of funding sources and requirements will happen during the coordinating body's semi-annual plan maintenance meetings.

Step 2: Complete risk assessment evaluation

The second step in prioritizing the plan's action items is to examine which hazards the selected actions are associated with and where these hazards rank in terms of community risk. The coordinating body will determine whether or not the plan's risk assessment supports the implementation of eligible mitigation activities. This determination will be based on the location of the potential activities, their proximity to known hazard areas, and whether community assets are at risk. Additionally, they will determine if the actions will benefit undeserved/socially vulnerable populations, and if they do those projects will have greater priority. The coordinating body will additionally consider whether the selected actions mitigate hazards that are likely to occur in the future, including alleviating long-term risk from climate change, or are likely to result in severe / catastrophic damages.

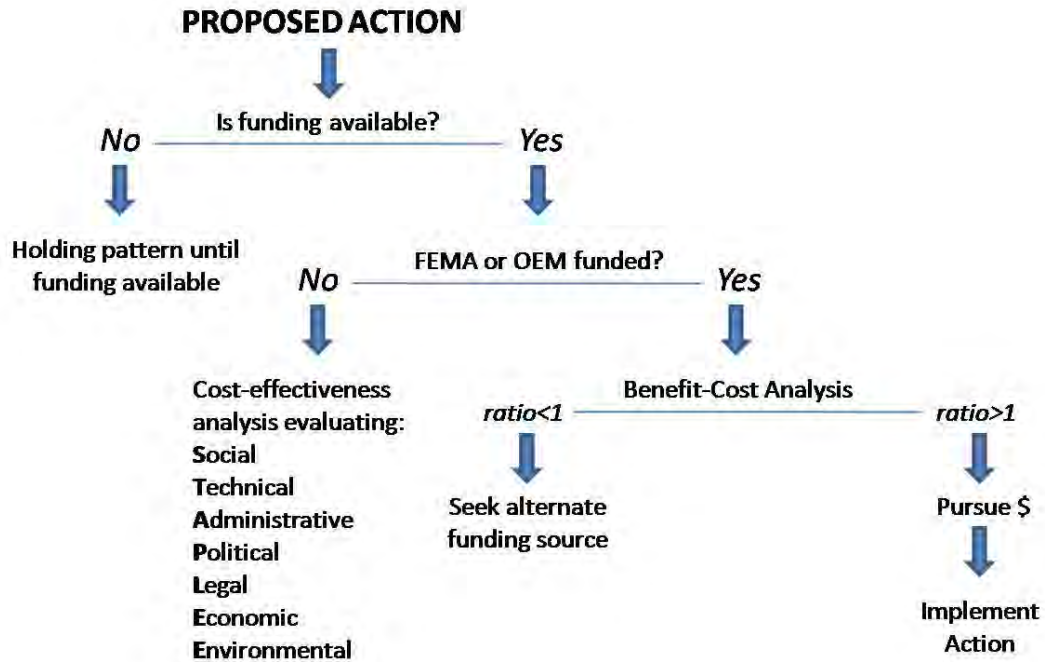
Step 3: Committee Recommendation

Based on the steps above, the coordinating body will recommend which mitigation activities should be moved forward. If the coordinating body decides to move forward with an action, the coordinating organization designated on the action item form will be responsible for taking further action and, if applicable, documenting success upon project completion. The coordinating body will convene a meeting to review the issues surrounding grant applications and to share knowledge and/or resources. This process will afford greater coordination and less competition for limited funds.

Step 4: Complete quantitative and qualitative assessment, and economic analysis

The fourth step is to identify the costs and benefits associated with the selected natural hazard mitigation strategies, measures or projects. Two categories of analysis that are used in this step are: (1) benefit/cost analysis, and (2) cost-effectiveness analysis using STAPLE/E (described below). Conducting benefit/cost analysis for a mitigation activity assists in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural hazards provides decision makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects. Figure 4.2 shows decision criteria for selecting the appropriate method of analysis.

Figure 4.2: Benefit Cost Decision Criteria



Source: Community Service Center’s Partnership for Disaster Resilience at the University of Oregon, 2010.

If the activity requires federal funding for a structural project, the Steering Committee will use a Federal Emergency Management Agency-approved cost-benefit analysis tool to evaluate the appropriateness of the activity. A project must have a benefit/cost ratio of greater than one in order to be eligible for FEMA grant funding.

For non-federally funded or nonstructural projects, a qualitative assessment will be completed to determine the project’s cost effectiveness. It is important that the Steering Committee prioritize actions with more benefits than other alternatives, which can be determined during a qualitative assessment.

The Steering Committee will consider using a multivariable assessment technique called STAPLE/E to prioritize these actions. STAPLE/E stands for Social, Technical, Administrative, Political, Legal, Economic, and Environmental. Assessing projects based upon these seven variables can help define a project’s qualitative cost effectiveness. The STAPLE/E technique has been tailored for use in natural hazard action item prioritization by the Partnership for Disaster Resilience at the University of Oregon’s Community Service Center. See Volume II, Appendix D: Economic Analysis for a description of the STAPLE/E evaluation methodology. The Steering Committee may decide to use another qualitative assessment method as needed.

Monitoring the Plan

The plan will be monitored by the Convener and the Steering Committee. Status of mitigation action items will be discussed at the semi-annual meetings, and the Convener will keep a record of the overall status of each item in a master list, whether they are in progress, deferred or no longer relevant. When evaluating the plan at the semi-annual meetings, it will also double as monitoring the plan, for in evaluating it for effectiveness the status of all items are also being monitored.

Evaluating the plan for Effectiveness:

Evaluating the plan for effectiveness is an essential element in keeping the Gilliam County Natural Hazard Mitigation Plan a relevant and useful document. Continuously evaluating the plan after approval, during the plan's implementation and prior to the update will ensure the plan is as effective as possible. The Steering Committee and the Convener will be responsible for this continuous evaluation process and at the semi-annual meetings they will assess the plan and ask the following questions to help determine its effectiveness:

- Are any Jurisdictions covered in the plan currently implementing any of the mitigation actions identified in the plan?
- How many mitigation actions are currently taking place throughout the planning area?
- How many mitigation projects have been accomplished?
- Are NHMP plan goals and priorities still aligning with what the public finds important?
- Is there available funding for the projects the Steering Committee prioritized?
- Is there public support for the completed projects and for projects the Steering Committee Prioritized?
- Have mitigation projects assisted the communities they were intended to assist?
- Are there additional projects that have been identified and need to be included in the plan?

The simplest way to measure plan effectiveness is through the number of projects completed, but also assessing community attitude towards projects and if identified mitigation actions are helping the communities they were intended to assist is essential for determining the effectiveness of the plan.

Continued Public Involvement and Participation

The participating jurisdictions are dedicated to involving the public directly in the continual reshaping and updating of the Gilliam County multi-jurisdictional Natural Hazards Mitigation Plan. Although members of the Steering Committee represent the public to some extent, the public will also have the opportunity to continue to provide feedback about the plan and be involved in the plan maintenance process.

Public participation was incorporated into every stage of the plan update process. All meetings were open to the public. Other forms of public involvement during the update process include:

- Post plan on the Gilliam County Emergency Management Website for comment (https://co.gilliam.or.us/government/sheriff_s_office/emergency_management.php)
- Post notices on the Gilliam County website noted above and as shown in Appendix B: Planning and Public Process, that invite public to comment via online survey
- Implement various other outreach activities documented in this plan (See Section 3: Mitigation Strategy and Appendix B: Planning and Public Process)
- Public Meetings
- Postings on Social Media

After the plan is complete, the Steering Committee will continue to seek public participation with the plan's implementation, monitoring and evaluation. This will be accomplished through:

- Periodic presentations on the plan's progress to elected officials and other community groups, including attending City Council Meetings and Senior Living Facilities.
- Continued outreach, particularly in schools, as noted in Section 3: Mitigation Strategy. When conducting this outreach information on the Natural Hazard Mitigation Plan will be included in addition to mitigation strategies.
- Post the final, approved version of the County's multi-jurisdictional Natural Hazards Mitigation Plan on the Gilliam county Emergency Management Website.
- Have the semi-annual Steering Committee Meetings open to the public. Advertise those meetings with posters in strategic locations in all three incorporated Cities.
- Include information on the Natural Hazards Mitigation Plan annually at the Gilliam County Fair in an informational Booth, with optional surveys for the public to fill out.

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. After this NHMP update, the Gilliam County Multi-jurisdictional Natural Hazards Mitigation Plan is due to be updated in 2029. The convener will be responsible for organizing the Steering Committee to address plan update needs. The Steering Committee will be responsible for updating any deficiencies found in the plan, and for ultimately meeting the Disaster Mitigation Act of 2000's plan update requirements. The records of mitigation action items completed and the notes from evaluating the plan for effectiveness from the Steering Committee Meetings that take place between 2024 and 2029 will be used to help make the 2029 plan more effective.

The following 'toolkit' can assist the convener in determining which plan update activities can be discussed during regularly-scheduled plan maintenance meetings, and which activities require additional meeting time and/or the formation of sub-committees.

Table 4.1: 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

Source: Oregon Partnership for Disaster Resilience (2010).

Table 4.1: Natural Hazards Mitigation Plan Update Toolkit (continued)

Question	Yes	No	Plan Update Action
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: Jurisdictional Addenda

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Purpose

This document serves as the City of Arlington’s Addendum to the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan (NHMP). This addendum supplements information contained in Volume I (Basic Plan) of this NHMP, which serves as the foundation for this jurisdiction’s addendum, and Volume III (Appendices), which provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the NHMP addendum addresses 44 CFR 201.6(c)(5, *Plan Adoption*, and 44 CFR 201.6(a)(3, *Participation*..)))

In April 2023 Gilliam County Emergency Management hired Fair Winds Consulting, LLC to update their NHMP, which expired January 16, 2024. This NHMP update is multi-jurisdictional, and includes Gilliam County and the Cities, including City of Arlington, Condon, and Lonerock. This project is funded through the Federal Emergency Management Agency’s Hazard Mitigation Grant Program, FEMA Award number DR-4599-OR to the State of Oregon. Gilliam County received a sub-grant through the State of Oregon, HMGP Sub-Grant 4599-02. Gilliam County solicited for a contractor to write the plan and entered into an agreement with Fair Winds Consulting, LLC in April 2023.

To be eligible to receive certain pre- and post-disaster natural hazard mitigation funds from FEMA, local governments must have a current, FEMA-approved NHMP. NHMPs must be updated and re-approved every five years. By developing this addendum to the Gilliam County NHMP, locally adopting it, and having it approved by FEMA, the City of Arlington will maintain eligibility for FEMA Hazard Mitigation, Building Resilient Infrastructure, and Communities, and Flood Mitigation Assistance grant program funds.

The Gilliam County NHMP, and Arlington Addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project Steering Committee guided the process of developing the plan. For more information on the composition of the Steering Committee see *Planning and Public Process* (Volume III, Appendix B).

The City Recorder of Arlington is the designated local convener and will take the lead in implementing, maintaining, and updating the addendum to the NHMP in collaboration with the designated convener of the Gilliam County NHMP (County Emergency Management).

Representatives from the City of Arlington Steering Committee convened on the following occasions (see Appendix B for more information):

- June 01, 2023 - Gilliam County NHMP Steering Committee Meeting #1
- September 26, 2023 – Arlington Steering Committee Meeting #1
- November 06, 2023 – Gilliam County NHMP Steering Committee Meeting #2

The City’s addendum reflects decisions decided upon at the plan update meeting and during subsequent work and communication with NHMP Update Coordinator.

The Arlington Steering Committee was comprised of the following representatives:

- Convener: Keri Hayter, City Recorder, City of Arlington
- Chris Fitzsimmons, Gilliam County Emergency Management
- Shanna Gronquist, City of Arlington Public Works
- Cori Mikkalo, Fair Winds Consulting, LLC

Public participation was achieved with the establishment of the Steering Committee, which was comprised of City officials representing different organizations and sectors. The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan’s development. In addition, community members outside of the Steering Committee were provided an opportunity for comment via the plan review process (see Appendix B for more information).

The Gilliam County NHMP was approved by FEMA on August 22, 2024 and the Arlington addendum was adopted via resolution on August 7, 2024. This NHMP is effective through August 21, 2029.

Mitigation Strategy

This section of the NHMP addendum addresses 44 CFR 201.6(c)(3)(iv), *Mitigation Strategy*.

During the 2024 Gilliam County NHMP update process the County and local Steering Committees re-evaluated the existing Mitigation Action Items. Following the review, actions were updated, noting what accomplishments had been made, and whether the actions were still relevant and if existing language needed to change. New action items were identified at this time (see Appendix B for more information). The City of Arlington developed a list of priority actions using a modified STAPLEE process. The City’s priority actions are listed below in Table AA-1. For the complete list of actions see Appendix A and Volume I, Section 3, Table 3-2. During the plan implementation and maintenance phase action item prioritization may be modified and could use the process identified in Volume I, Section 4.

New mitigation items for 2024 were created, as well as updating the 2018 mitigation action items.

Table AA-I Arlington Priority Action Items

Action Item	Action Item Title	Coordinating Organization	Timeline	Potential Funding Source*
MH #4 Priority	Seek funding for backup generators for critical facilities including Arlington Clinic, North Gilliam County Emergency Medical Services, Arlington Middle School, Arlington High School, Arlington City Hall and Arlington Water Pumping Station.	Gilliam County Emergency management	Long Term (3-5 years)	Federal and State Grants
MH #11	Establish a multipurpose Community Resilience Center in Arlington to provide shelter and resources during fire, climate, and other emergencies. Install back-up generators to power buildings with emergency shelter capabilities, air filtration systems and air conditioning systems.	Gilliam County Emergency Management	Long Term (3-5 years)	State and Federal Funding
EQ #3	Seismically retrofit critical facilities not included in the DOGAMI 2006 assessment: Arlington Medical Clinic, Arlington City Hall and Arlington Childcare Center.	Gilliam County Planning Department	Long Term (3-5 years)	State and Federal Funding
WF #2 Priority	Create firebreaks around vulnerable facilities through fire resistant plants, hardscaping or through vegetation management. Purchase equipment and supplies for establishing fuel breaks, including irrigation type water line, vegetation management equipment.	City of Arlington	Ongoing	Local, State and Federal Funding
WF #5	Develop a program for prescribed animal grazing in high-risk areas throughout the County, including exploring a cost share option with private landowners.	Gilliam County Fire Services	Ongoing	Local Sources, State and Federal Funding
WF #10 Priority	Reduce wildfire fuel load through weed abatement projects and fuel/fire breaks in the City of Arlington.	City of Arlington	Ongoing	Local, State and Federal Funding

Source: City of Arlington NHMP Steering Committee, 2023.
EQ=Earthquake, WF=Wildfire, MH=MultiHazard

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Arlington addendum to the Gilliam County NHMP. This addendum designates a coordinating body and a convener to oversee the development and implementation of action items. Because the City addendum is part of the county’s multi-jurisdictional NHMP, the City will look for opportunities to partner with the county. The City’s Steering Committee will convene after re-adoption of the City of Arlington addendum on an annual schedule; the county is meeting on a semi-annual basis and will provide opportunities for the Cities to report on NHMP implementation and maintenance during their meetings. The City Recorder will serve as the convener and will be responsible for assembling the Steering Committee (coordinating body). The Steering Committee will be responsible for:

- identifying new risk assessment data,
- reviewing status of mitigation actions,
- identifying new actions, and
- seeking funding to implement the City’s mitigation strategy (actions).
- Monitoring the status of action items and the effectiveness of the plan

The convener will also remain active in the county’s implementation and maintenance process (see Volume I, Section 4 for more information).

The City will utilize the same prioritization process as the county (See Volume I, Section 4: Plan Implementation and Maintenance and Volume III, Appendix D: Economic Analysis for more information).

Implementation through Existing Programs

Many of the recommendations in the Natural Hazards Mitigation Plan are consistent with the goals and objectives of the City’s existing plans and policies. Where possible, the City of Arlington will implement the recommended actions in the NHMP through existing plans and policies. Plans and policies already in existence have support from local residents, businesses, and policy makers. When updating plans and policies, as well as considering changing zoning requirements, the City will review the Natural Hazards Mitigation Plan.

Arlington’ acknowledged comprehensive plan is the Arlington Comprehensive Plan. The Oregon Land Conservation and Development Commission first acknowledged the plan in 2003. The City implements the plan through building codes and zoning ordinances drafted by the State of Oregon. The City has six full time staff, including four public works employees. The City contracts for planning and engineering services.

Funding resources available to the City of Arlington include:

- General funds
- Authority to levy taxes for specific purposes
- Wind Farm community service fee
- Incur debt through bonds
- ODOT funds for state highway maintenance
- Utility fees
- Host fees for waste treatment facility and chemical waste facility

Any of these funds may be applied to mitigation actions. Recent infrastructure upgrades were funded through City bond measures. See Appendix F – Grant Programs for additional financial resources.

Arlington currently has the following plans, programs, and policies that relate to natural hazard mitigation. When updating the following plans or creating new ones, the NHMP should be used as an essential reference document, integrating mitigation in the beginning and throughout all planning processes.

Table AA-2 Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name	Effects on Hazard Mitigation and capability to expand
Plans	Waste water treatment plan (2006)	25 year plan, accounts for natural risks and could be used to mitigate an extreme flood event. When the plan is updated, the NHMP should be used to help inform risk decisions.
	Water Distribution (2001)	Describes water storage and distribution system for the City. Can be expanded by the city to account for drought.
	Weed Abatement (2017)	Reduces wildfire fuel load around the City. Can be expanded upon and more strict regulations put into effect.
	Comprehensive Plan (2011)	Guides development for the City in accordance with state standards, including hazard mitigation and safety requirements.
Programs	Mutual Aid Agreements	Provides personnel and equipment for emergency management, especially fire response. Can be expanded upon or shrunken down depending on City and regional need.

Continued Public Participation

Keeping the public informed of the City's efforts to reduce the City's risk to future natural hazards events is important for successful plan implementation and maintenance. The City is committed to involving the public in the plan review and updated process. All City meetings on the Natural Hazards Mitigation Plan will be advertised and open to the public, including periodic presentations on mitigation actions at City Council Meetings. See Volume I, Section 4, for more information.

Plan Maintenance

The Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan and City addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the City will also review and update its addendum. The convener will be responsible for convening the Steering Committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the Steering Committee determine what components of the mitigation plan need updating. The Steering Committee will be responsible for updating any deficiencies found in the plan.

Risk Assessment

This section of the NHMP addendum 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 hazard risk has three phases:

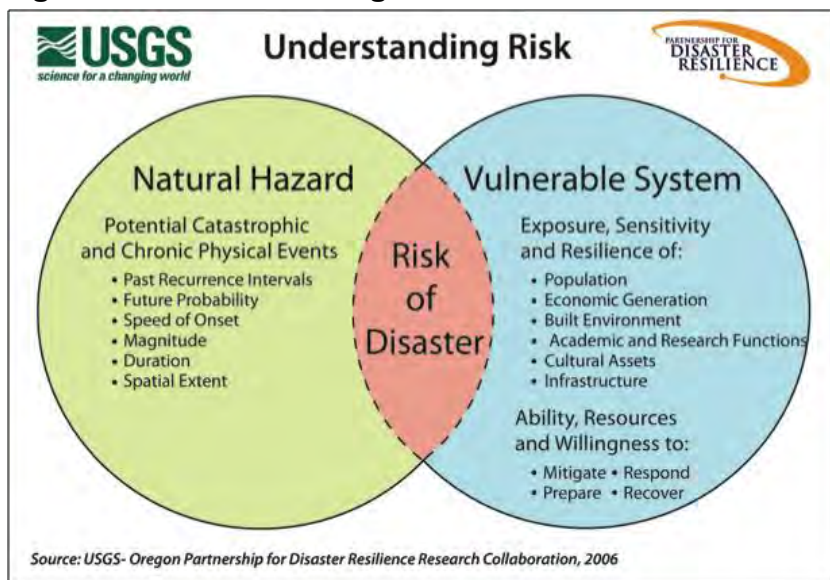
Phase 1: Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.

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 local level rationale for the identified mitigation strategies (action items) is presented herein, and within Section 2, *Risk Assessment*, and Appendix C, *Community Profile*. The risk assessment process is graphically depicted in Figure AA-1. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure AA-1 Understanding Risk



Hazard Analysis Methodology

This NHMP utilizes a hazard analysis methodology that was first developed by FEMA circa 1983, and gradually refined by the Oregon Department of Emergency Management (OEM) over the years.

The methodology produces scores that range from 24 (lowest possible) to 240 (highest possible). Vulnerability and probability are the two key components of the methodology. Vulnerability examines both typical and maximum credible events, and probability endeavors to reflect how physical changes in the jurisdiction and scientific research modify the historical record for each hazard. Vulnerability accounts for approximately 60% of the total score, and probability approximately 40%.

This method provides the jurisdiction with a sense of hazard priorities, or relative risk. It doesn't predict the occurrence of a particular hazard, but it does "quantify" the risk of one hazard compared with another. By doing this analysis, planning can first be focused where the risk is greatest.

In this analysis, severity ratings, and weight factors, are applied to the four categories of history, vulnerability, maximum threat (worst-case scenario), and probability as shown in the table below. See Volume I, Section 2 (*Risk Assessment*) for more information.

Hazard Analysis

The Arlington Steering Committee developed their hazard vulnerability assessment (HVA), using the county’s HVA as a reference. Changes from the county’s HVA were made where appropriate to reflect distinctions in vulnerability and risk from natural hazards unique to Arlington, which are discussed throughout this addendum.

Table AA-3 shows the HVA matrix for Arlington showing each hazard listed in order of rank and risk level from high to low. For local governments, conducting the hazard analysis is a useful step in planning for hazard mitigation, response, and recovery. The method provides the jurisdiction with sense of hazard priorities, but does not predict the occurrence of a particular hazard.

Two chronic hazards (winter storm and wildfires) rank as the top hazard threats to the City, with Extreme Weather also representing a high risk. Drought and windstorms represented the next two moderate risk hazards, and volcanic events, floods and earthquakes comprise the lowest ranked hazards.

Table AA-3 Hazard Analysis Matrix – Arlington

Hazard	History	Probability	Vulnerability	Maximum Threat	Total	Rank	Risk Level
Winter Storms/ Landslides	9	10	10	10	238	1	High
Wildfire	7	10	10	10	234	2	High
Extreme Weather	8	10	8	8	206	3	High
Drought	4	7	8	10	197	4	Moderate
Windstorms	8	8	4	7	163	5	Moderate
Volcanic Events	1	2	8	8	136	6	Low
Floods	3	2	4	9	130	7	Low
Earthquakes	1	1	8	8	129	8	Low

Source: Arlington NHMP Steering Committee, 2023

Table AA-4 categorizes the probability and vulnerability scores from the hazard analysis for the City and compares the results to the assessment completed by the Gilliam County NHMP Steering Committee (areas of differences are noted with **bold** text within the City ratings). The City ranked their vulnerability to earthquake and volcanic events as higher than the county, and their probability of droughts, floods, and earthquake as lower. The rationales for these differences in vulnerability and probability are explained in each hazard subsection below. City specific hazard extent, location, and history is described below as well.

Table AA-4 Probability and Vulnerability Comparison

Hazard	City of Arlington		Gilliam County	
	Probability	Vulnerability	Probability	Vulnerability
Wildfire	High	High	High	High
Winter Storm/Landslide	High	High	High	High
Drought	Moderate	High	High	High
Extreme Weather	High	High	High	High
Floods	Low	Moderate	High	Moderate
Earthquake	Low	High	Moderate	Moderate
Windstorm	High	Moderate	High	Moderate
Volcanic Event	Low	High	Low	Low

Source: Arlington NHMP Steering Committee and Gilliam County NHMP Steering Committee, 2023.

Hazard Probability:

Compared to Gilliam County, the hazard analysis for the City of Arlington identified zero hazards with *higher* probability.

The City of Arlington and Gilliam County identified *equal* probability for future occurrences to five hazards that include:

- Wildfire
- Winter Storm
- Extreme Weather
- Windstorm
- Volcanic Event

The hazard analysis for the City of Arlington identified *lower* probability for the remaining three hazards compared to Gilliam County:

- Drought
- Flood
- Earthquake

Based on historic events, the City of Arlington rated the probability of future occurrences for these three hazards lower than the county.

Although droughts commonly occur throughout Gilliam County and the surrounding region, the hazard has had little or no effect of the City. The City has neither restricted water usage because of a drought nor requested assistance from other jurisdictions to respond to a drought. Therefore, the probability of a drought hazard impacting the City is lower than the County.

The Columbia River is regulated by upstream dams, so the potential for flooding does not present much of a problem compared to the tributaries of the river. This is partly reflected

in the federal flood insurance rate map for the City. Therefore, the probability for flood in the City is lower than the County.

Although the City regularly experiences winds, wind speeds rarely rise to destructive or dangerous speeds. In previous years, wind storms caused power outages and property damage due to downed power lines and trees, but infrastructure upgrades have mitigated the impact.

Hazard Vulnerability:

Compared to Gilliam County, the hazard analysis for the City of Arlington identified *higher* vulnerability to two hazards that include:

- Earthquake
- Volcanic Event

The northern part of Gilliam County, which includes the City of Arlington, generally has higher ground shake amplification, liquefactions, and earthquake-induced landslides than the rest of the county. Also, both schools in the City of Arlington have a high or very high collapse potential rating, and a majority of the infrastructure in the City is aging. Therefore, the City has a higher vulnerability to earthquake than the County.

The City experienced ash fallout in 1980 from the eruption of Mount St. Helens. Ash fallout can disrupt or damage transportation systems, electrical systems, water systems, and wastewater systems, and can also effect populations, particularly people with chronic respiratory problems. Arlington is closer to the active volcanoes in the Cascade Range than other communities in Gilliam County. Because of these concerns, the City has a higher vulnerability to a volcanic event than the County.

The City of Arlington and Gilliam County identified *equal* vulnerability for the remaining six hazards that include:

- Wildfire
- Winter Storms
- Drought
- Extreme Weather
- Flood
- Windstorm

The hazard analysis for the City of Arlington identified zero hazards with *lower* vulnerability compared to Gilliam County.

Representatives from the City of Arlington expressed concern about two hazards in particular; severe weather/winter storm and wildfire. Tourists along with local residents could potentially be at risk during severe weather, especially heavy ice and snow storms during the winter months. Interstate Highway 84 and Oregon Route 19 can become impassable and shut down during severe winter storms, cutting the City off to the outside. The concern is if the City became isolated for several days and lost power, many residents would be in extreme danger.

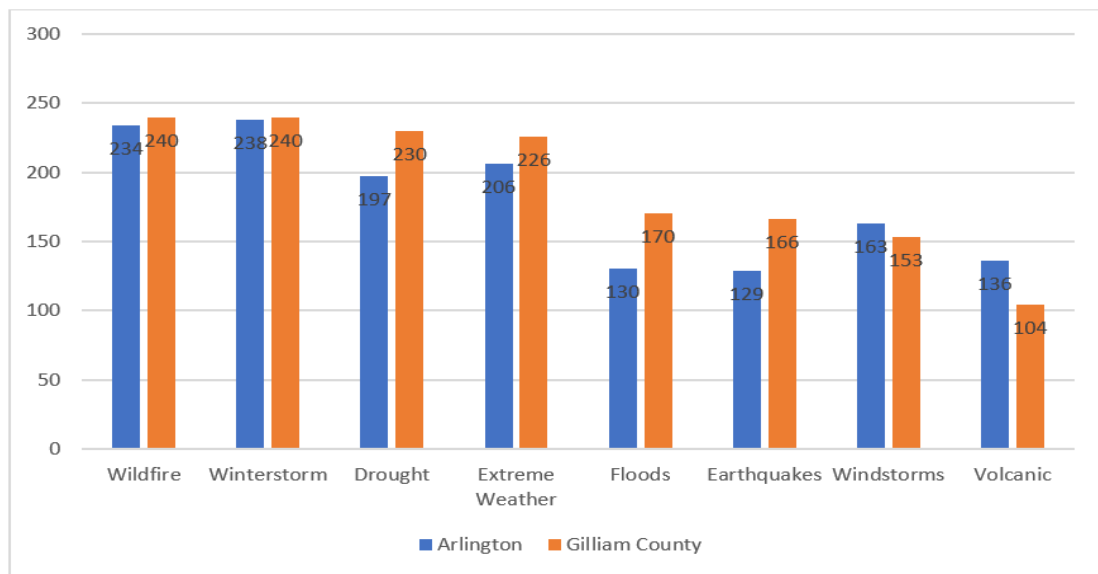
The City also expressed concern for wildfires fueled by strong winds in the Columbia Gorge that frequently threatening the city during warm, dry summer months. Much of the City of Arlington is built on steep slopes which can help fuel fire when coupled with high winds, particularly during drought conditions. In addition, already limited fire protection could become overwhelmed during a wildfire since the local rural fire protection district is made of volunteers with one full time Fire Chief, which severely limits emergency capacity during an event. Because of these concerns, the City of Arlington determined that severe weather/winter storm and wildfire are the top two natural hazards.

Summary

Figure AA-2 presents a summary of the hazard analysis for the City of Arlington and compares the results to the assessment completed by Gilliam County.

The City rated their threat from windstorms and volcanic events as higher than the county, and their threat from wildfire, winterstorm, drought, extreme weather, flood, and earthquake as lower than the county.

Figure AA-2 Overall Hazard Analysis Comparison–Gilliam County/Arlington



Source: City of Arlington NHMP Steering Committee and Gilliam County NHMP Steering Committee, 2023

Community Asset Identification

This section provides information on City specific assets. For additional information on the characteristics of Arlington, in terms of geography, environment, population, demographics, employment and economics, as well as housing and transportation see Volume III, Appendix C, *Community Profile*. Many of these community characteristics can affect how natural hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the City specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

It should be noted that Census data can be inaccurate at the small City level.

Community Characteristics

Arlington is located at the northern border of Gilliam County and the state of Oregon, where the Columbia River divides Oregon and Washington. Interstate-84 passes through Arlington east-west, and State Highway 19 is the major north-south route connecting Arlington with Condon, the County seat. Arlington contains about 1.78 square miles, 0.62 of which is water (26%).¹ The climate of Arlington is semi-arid, characterized by dry, warm summers and cold winters; the average monthly temperatures range from 62-91 degrees in July and August, and 29-42 degrees in December and January. The City receives approximately 9.26 inches of rain and 5.4 inches of snow each year.² Monthly precipitation is about .9-1.6 inches during the wetter months of November – March, and average less than 0.5 inches during the drier months of June - September. The City is located on a slight slope just south of the Columbia River. It was relocated in 1958 when the John Day Dam construction inundated the original city site.³ As such, the majority of Arlington houses (67%) were built after 1960; 26% were built after 1990, and likely have low seismic vulnerability. Of the 252 housing units in Arlington, 8.7% are vacant.⁴ Significantly lower than the 16% vacancy rate noted in the 2016 Census. Workers employed seasonally at wind farms often commute from other communities.⁵ Minimal new development has taken place within the city. A restaurant was torn down and replaced with a gas station, and less than 5 new houses have been built. Overall, the population and number of businesses remain very stable. A new housing development is planned in Columbia View Estates with potential to add up to 20 more housing units, but it is very much in the planning stages and ground has not been broken.

Economy

The median household income in Arlington is \$56,944, slightly higher than that of Gilliam County as a whole (\$51,705) and significantly lower than the state of Oregon (\$75,657).⁶ Arlington' largest industries are Administrative & Support & Waste Management Services, Construction; and Accommodation & Food Services. The City contains a waste management facility that serves the metro area of Portland. Retail trade, along with Educational Services, and utilities create roughly 25% of local jobs as well.⁷ The unemployment rate is 4.1%, slightly less than 1% higher than that of the County overall (3.3%).⁸ While the area is home to many wind farms, including Shephard's Flat, one of the world's largest windfarms, none are located on city property.⁹

¹Gilliam County Community Wildfire Protection Plan 2022

² Western Regional Climate Center , NCDC Monthly Tabular Data, 1981-2023; <https://w1.weather.gov/climate/xmacis.php?wfo=pdt>

³ History, Arlington Community Chamber of Commerce, retrieved 5/22/2018, <http://www.visitarlingtonoregon.com/history/>

⁴ Social Explorer Tables: ACS 2022 (5-Year Estimates) (SE), Social Explorer DP04 U.S. Census Bureau

⁵ City of Arlington NHMP Steering Committee, September 2023

⁶ ACS 2021 (5-Year Estimates) U.S. Census Bureau

⁷ ACS 2021 (5-Year Estimates) U.S. Census Bureau

⁸ Social Explorer Tables: ACS 2022 (5 year Estimates) (SE), Social Explorer Table DP03 U.S. Census Bureau

⁹Department of Energy, retrieved 1/02/2024; <https://www.energy.gov/lpo/shepherds-flat#:~:text=Shepherds%20Flat%20is%20one%20of,the%20U.S.%20at%20large%20scale>.

Population Characteristics

The total population of Arlington is 628 people.¹¹ 19% of the Arlington population is over 65 years old, and 26% is under 18 years old. A high percentage of children indicates a vulnerable population requiring extra services in a disaster situation. 7.6% of Arlington residents identify as Hispanic or Latino. 13.2% lives below the federal poverty level, the majority of which are working age residents.¹² Interestingly, only 5.7% of residents moved into the City within the past year.

Asset Inventory

Creating an asset inventory is the first step of a vulnerability analysis. Assets that may be affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

The asset inventory delineates the City's existing building and infrastructure assets in detail in Table AA-5.

Table AA-5 Arlington Critical Facilities and Infrastructure

Facility Name	Facility Type
Arlington Elementary School (built 1963)	Educational
Arlington High School (built in 1952)	Educational
Arlington Medical Clinic	Care Facility
City Hall	Government
North Gilliam Co. Rural Fire Protection District Station	Emergency Response
Wastewater Treatment	Utilities
Water System	Utilities
Interstate 84 Access Ramps	Utilities

Source: City of Arlington Steering Committee, September 2023

See hazard sections below and Section 2, *Risk Assessment*, for potential hazard vulnerabilities to these facilities.

¹¹ Portland State University Population Research Center; Certified Population Estimates, Cities 2020

¹² ACS 2022 (5-Year Estimates) (SE), Social Explorer Tables P9, S1701, DP04 U.S. Census Bureau

Hazard Characteristics and Impact

Please review the Risk Assessment (Volume I, Section 2) for additional information on these hazards.

Drought

The Steering Committee determined that the City's probability for drought is **moderate** (which is lower than the county's rating) and that their vulnerability to drought is **high** (which is the same as the county's rating).

Volume I, Section 2, *Risk Assessment*, describes the characteristics of drought hazards, as well as the location and extent of a potential event. Moderate droughts occur regularly in Gilliam County, primarily impacting the agricultural industry and increasing the risk of wildfire. These droughts rarely impact City water supply, leading to insignificant drought history and low probability. However, if a drought did occur, the Arlington Steering Committee estimates that more than 10% of the population would be impacted due to rationing, indicating a high vulnerability.

Arlington's primary water supply comes from local groundwater sources and is stored in reservoirs totaling 1,950,000 gallon storage capacity. Water is treated with chlorine. In general, water supply is available and sufficient. Drought declarations have occurred due to the water needs of agricultural and livestock operations in the area. The City has never experienced a lack of water for residents' needs or rationed water.¹³

Earthquake

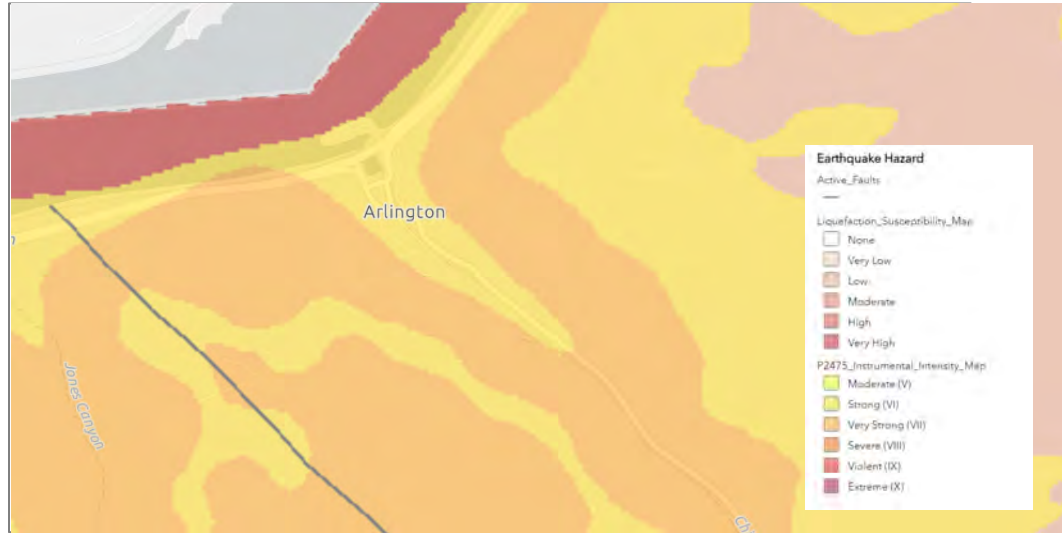
The Steering Committee determined that the City's probability for an earthquake event is **low** (which is lower than the county's rating) and that their vulnerability is **high** (which is higher than the county's rating). While Gilliam County will experience moderate shaking overall, the City of Arlington will experience moderate to strong shaking.

Volume I, Section 2, *Risk Assessment*, describes the characteristics of earthquake hazards, history, as well as the location and extent of a potential event. Generally, an event that affects the county is likely to affect Arlington slightly more, according to the expected shaking studies conducted by DOGAMI. The liquefaction potential in Arlington is low to none, although areas on the slopes above Arlington may experience moderate liquefaction. Expected shaking is moderate to strong for a local event and moderate for a Cascadia Subduction Zone event. The causes and characteristics of an earthquake event are described within the county's plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the county's plan. Local residents do not recall experiencing earthquake shaking in the area. The community impacts described by the county would occur in Arlington to a similar extent, with slightly more collapse potential due to stronger shaking. Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of

¹³ City of Arlington Steering Committee, 9/26/2023

earthquakes, but it is possible to predict the behavior of soil at any particular site. Arlington has little soft-soil hazard, although land adjacent to the municipal airport is moderately susceptible (Figure AA-3).

Figure AA-3 Expected Shaking and Soft Soils



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI), accessed on 12/17/2023

As noted in the Community Profile approximately 69% of residential buildings were built prior to 1980, which increases the City’s vulnerability to the earthquake hazard because building codes were different. Information on specific public buildings’ (schools and public safety) estimated seismic resistance, determined by DOGAMI in 2007, is shown in Table AA-6; each “X” represents one building within that ranking category. Of the facilities evaluated by DOGAMI using RVS, two (2) have a very high (100% chance), and two (2) have a high (>10%) collapse potential. In addition to building damages, utility (electric power, water, wastewater, natural gas) and transportation systems (bridges, pipelines) may experience some damage.

Table AA-6 Rapid Visual Survey Scores

Facility	Address	Site ID*	Level of Collapse Potential			
			Low (< 1%)	Moderate (>1%)	High (>10%)	Very High (100%)
Public Safety						
Oregon State Police^	Hwy 19 and Columbia St	Gill_pol04	X			
North Gilliam County RFPD^^	1500 Cottonwood St	Gill_fir02	X			
Schools						
Arlington Elementary School	1400 Main St	Gill_sch02				X, X
Arlington High School	1200 Main St	Gill_sch03			X,X	

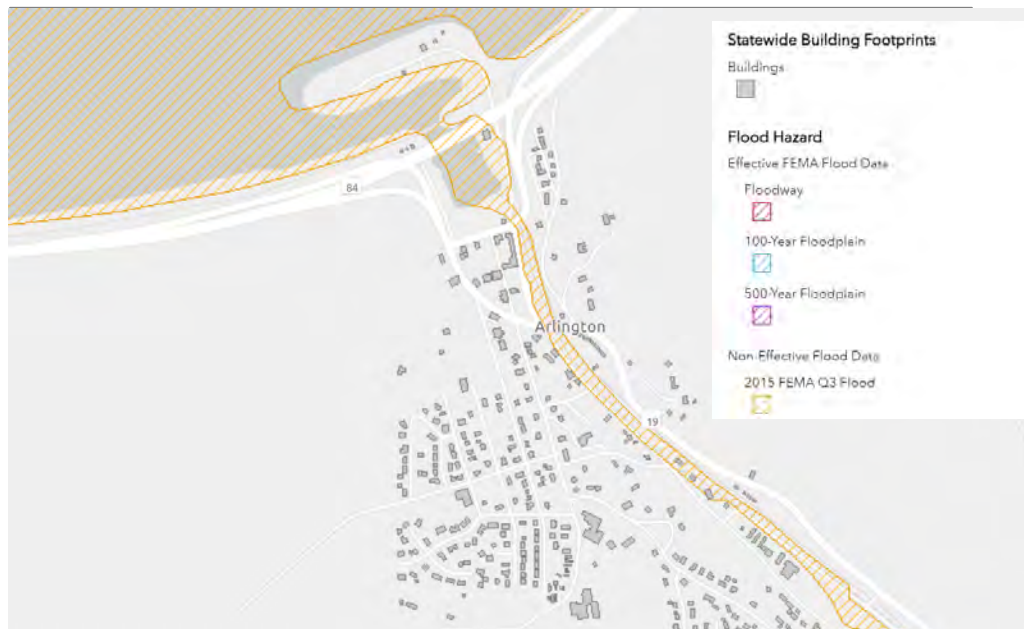
Source: DOGAMI 2007. Open File Report 0-07-02. Statewide Seismic Needs Assessment Using Rapid Visual Assessment. “*” – Site ID is referenced on the RVS Gilliam County Map; ^Oregon State Police facility has been renamed the Gilliam County Sheriff’s Office; “^^” Indicates building has been retrofit or rebuilt since 2007 Rapid Visual Assessment

Flood

The Steering Committee determined that the City's probability for flood is **low** (which is lower than the county's rating) and that their vulnerability to flood is **moderate** (which is the same as the county's rating). This difference in probability is due to residents' personal experiences of flood events, which is that they rarely occur and almost never rise to the level of property damage.

Volume I, Section 2, *Risk Assessment*, describes the causes and characteristics of flooding hazards within the region, as well as previous flooding occurrences. General flood-related community impacts are described within the Flood Hazard Annex of Gilliam County's Natural Hazards Mitigation Plan. Portions of Arlington have areas of floodplains (special flood hazard areas). These include areas along the Columbia River and John Day highway/Hwy 19/China Ditch, especially Earl Snell Memorial Park (see Figure AA-4). However, damage from floods has been historically negligible. The entire community would be impacted if a severe flood affected the waste water treatment plant; other impacts are minimal.

Figure AA-4 Special Flood Hazard Area



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI) accessed on 12/17/2023

National Flood Insurance Program (NFIP)

FEMA is currently in the process of modernizing the Arlington Flood Insurance Rate Maps (FIRMs); the FIRMs are the originals from 1984. Table AA-7 shows that as of January 2024, Arlington has 0 National Flood Insurance Program (NFIP) policies in force. Neither Arlington nor Gilliam County is a member of the Community Rating System (CRS). There has been a total of one (1) paid claim in the County, and none in the City of Arlington. The Community Repetitive Loss record for

Arlington identifies no Repetitive Loss Properties¹⁴ and no Severe Repetitive Loss Properties¹⁵.

Table AA-7 Flood Insurance Detail

Jurisdiction	Effective FIRM and FIS	NFIP Policies	Insurance in Force	Total Paid Claims	Total Paid Amount
Gilliam County	9/24/1984	4	\$1,105,000	1	
Arlington	9/24/1984	0	\$ -	0	\$1,156

Source: Dave Lentzner, Department of Land Conservation and Development, February 2018.

Volcanic Event

The Steering Committee determined that the City’s probability for volcanic event is **low** (which is the same as the county’s rating) and that their vulnerability to volcanic event is **high** (which is higher than the county’s rating). This higher vulnerability is due to Arlington’s closer proximity to Mt. Hood and Mt. St. Helens.

Volume I, Section 2, *Risk Assessment*, describes Arlington’ risk to volcanic events. Generally, an event that affects the county is likely to affect Arlington as well. The causes and characteristics of a volcanic event are described within the county’s plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the county’s plan, and the community impacts described by the county would generally be the same for Arlington as well. Arlington is very unlikely to experience anything more than volcanic ash during a volcanic event. When Mt. Saint Helens erupted in 1980, Arlington experience significant ash fall.

Wildfire

The Steering Committee determined that the City’s probability for wildfire is **high** (which is the same as the county’s rating) and that their vulnerability to wildfire is **high** (which is the same as the county’s rating). The City is more vulnerable to wildfire due to residential properties on steep slopes on both borders of the City.

Volume I, Section 2, *Risk Assessment*, describes the causes and characteristics of wildfires, as well as the county and City’s history of wildfire events. Small to moderate wildfires occur

¹⁴ A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

¹⁵ A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding \$5,000 and with cumulative amount of such claims payments exceeding \$20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

every one-three years on the western slopes of the City. In the past 12 years, fires have destroyed two homes and threatened evacuations several times. The location and extent of wildfires vary depending on fuel, topography, and weather conditions, but Arlington is surrounded by dry grasses and frequently experiences dry, hot, windy summers, resulting in high wildfire likelihood.

The potential community impacts and vulnerabilities described in the county's NHMP are generally accurate for the City as well. Gilliam County updated their Community Wildfire Protection Plan (CWPP) in 2022, which describes how summer weather, terrain, crops and natural vegetation of Gilliam County lends itself to the ongoing problem of wildfires throughout the County.

The Gilliam County CWPP provides some risk and vulnerability information related to Arlington that has been incorporated into this plan as applicable.¹⁶

Windstorm

The Steering Committee determined that the City's probability for windstorm is **high** (which is the same as the county's rating) and that their vulnerability to windstorm is **moderate** (which is the same as the county's rating).

Volume I, Section 2, *Risk Assessment*, describes the causes and characteristics of windstorms, as well as the location and extent of windstorm hazards. The region's (and City's) history of events is adequately described within the county's plan as well. Because windstorms typically occur during winter months, they are sometimes accompanied by ice, freezing rain, flooding, and snow. For the purposes of this plan, windstorms are considered an individual hazard, distinct from winter storms. Alone, they have much lower potential to affect the City.

Gilliam County's plan describes the impacts caused by windstorms, including power outages, downed trees, and storm-related debris. Although Arlington experiences near constant winds, the wind speeds rarely rise to an emergency level. Wind events rarely cause utility or property related damages.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Winter Storm

The Steering Committee determined that the City's probability for winter storm is **high** (which is the same as the county's rating) and that their vulnerability to winter storm is **high** (which is the same than the county's rating).

Volume I, Section 2, *Risk Assessment*, describes the causes and characteristics of winter storms, as well as the location and extent of winter storm hazards. The region's (and City's) history of events is adequately described within the county's plan. Severe winter storms can consist of rain, freezing rain, ice, snow, extreme cold, and wind. They originate from frigid air moving west from the Wallowa Mountains. These storms are most common from

¹⁶ Gilliam County Wildfire Protection Plan, 2022.

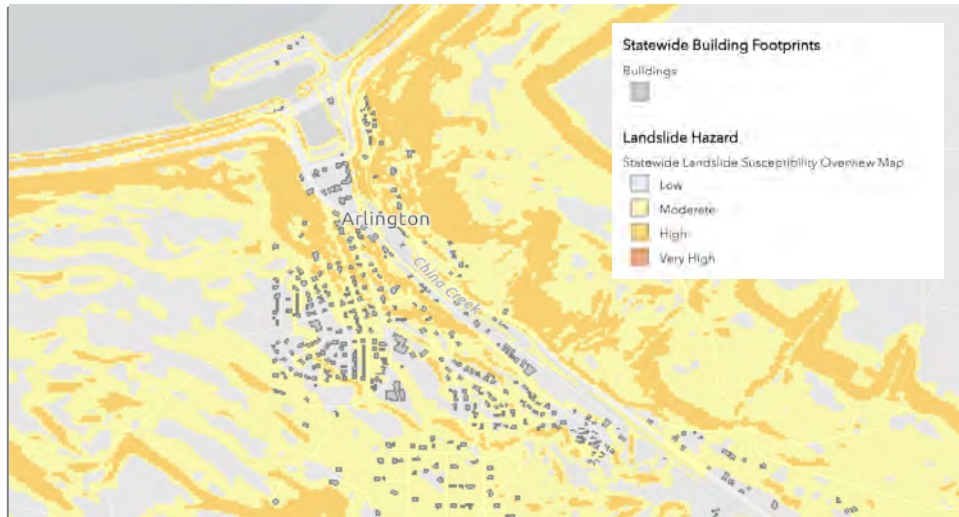
November through March and occur every 2-3 years. The most common impact to Arlington is freezing rain, which disrupts traffics and causes accidents. Storms are rarely associated with flooding or landslides.

Major winter storms can and have occurred in the Arlington area, and while they typically do not cause significant damage, they are frequent and have the potential to impact economic activity. Interstate-84 is closed due to winter storm impacts annually, usually outside of the County or City boundaries. The City may experience diminished food and fuel supplies in the event of a closure. Historically, the City experienced annual power outages due to winter storms, but recent infrastructure upgrades have reduced power outage instances.

Landslides

Like Gilliam County, Arlington does not experience significant landslides or consider them a substantial hazard. Landslide susceptibility exposure for Arlington is shown in Figure AA-5. Approximately 63% of Arlington has Low landslide susceptibility, 25% has moderate, and 12% has high landslide susceptibility.¹⁷ The highest risk areas are on the eastern and western slopes on the borders of the City.

Figure AA-5 Landslide Susceptibility Exposure



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI) accessed on 12/17/2023

Potential landslide-related impacts are described within the county’s NHMP, and include infrastructural damages, economic impacts (due to isolation and/or arterial road closures), property damages, and obstruction to evacuation routes. Roads outside of Arlington are occasionally impacted by rockfall.

¹⁷ DOGAMI Open-File Report, O-16-02, Landslide Susceptibility Overview Map of Oregon (2016)

Extreme Weather

The steering committee determined that the city's probability for extreme weather is **high** (which is the same as the county's rating) and that their vulnerability to extreme weather is **high** (which is the same than the county's rating).

Volume I, Section 2, Risk Assessment, adequately describes the causes and characteristics of extreme weather. In general, Arlington experiences extreme heat, extreme cold and summer rain impacts. The region's (and city's) history of events is adequately described within the county's plan. Extreme weather can consist of extreme heat events, extreme cold events and summer storms including hail. Extreme heat and cold are annual to biannual occurrences, with hail storms being very infrequent with currently no recorded damaging hail storms.

Extreme heat events can and have occurred in the Arlington area, and while they typically do not cause significant damage, they are frequent and have the potential to impact residents. Arlington Citizens expect extreme temperatures annually, and for the most part are prepared for extreme heat an extreme cold.

A primary vulnerability of Arlington is the significant number of elderly residents who are more vulnerable to extreme temperatures, as well as a denser youth population than elsewhere in the county.

¹⁷ DOGAMI Open-File Report, O-16-02, Landslide Susceptibility Overview Map of Oregon (2016)

Purpose

This document serves as the City of Condon’s Addendum to the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan (MNHMP, NHMP). This addendum supplements information contained in Volume I (Basic Plan) of this NHMP, which serves as the foundation for this jurisdiction’s addendum, and Volume III (Appendices), which provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the NHMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation*.

In April 2023 Gilliam County Emergency Management hired Fair Winds Consulting, LLC to update their NHMP, which expired January 16, 2024. This NHMP update is multi-jurisdictional, and includes Gilliam County and the Cities, including City of Arlington, Condon, and Lonerock. This project is funded through the Federal Emergency Management Agency’s Hazard Mitigation Grant Program, FEMA Award number DR-4599-OR to the State of Oregon. Gilliam County received a sub-grant through the State of Oregon, HMGP Sub-Grant 4599-02. Gilliam County solicited for a contractor to write the plan and entered into an agreement with Fair Winds Consulting, LLC in April 2023.

To be eligible to receive certain pre- and post-disaster natural hazard mitigation funds from FEMA, local governments must have a current, FEMA-approved NHMP. NHMPs must be updated and re-approved every five years. By developing this addendum to the Gilliam County NHMP, locally adopting it, and having it approved by FEMA, the City of Arlington will maintain eligibility for FEMA Hazard Mitigation, Building Resilient Infrastructure, and Communities, and Flood Mitigation Assistance grant program funds.

The Gilliam County NHMP, and Condon Addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. The project Steering Committee guided the process of developing the plan. For more information on the composition of the Steering Committee see *Planning and Public Process* (Volume III, Appendix B).

The Public Works Superintendent is the designated local convener and will take the lead in implementing, maintaining, and updating the addendum to the NHMP in collaboration with the designated convener of the Gilliam County NHMP (County Emergency Management).

Representatives from the City of Condon Steering Committee convened on the following occasions (see Appendix B for more information):

- June 1, 2023 - Gilliam County NHMP Steering Committee Meeting #1
- September 26, 2023 – Condon Steering Committee Meeting #1
- November 6, 2023 – Gilliam County Steering Committee Meeting #2

The City’s addendum reflects decisions decided upon at these NHMP meetings and during subsequent work and communication with NHMP Update Coordinator.

The Condon Steering Committee was comprised of the following representatives:

- Convener: Gibb Wilkins, City of Condon Public Works Superintendent
- Chris Fitzsimmons, Gilliam County Emergency Management
- Kathryn Greiner, City of Condon Administrator
- Cori Mikkalo, Fair Winds Consulting, LLC

Public participation was achieved with the establishment of the Steering Committee, which was comprised of city officials representing different organizations and sectors. The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan’s development. In addition, community members outside of the Steering Committee were provided an opportunity for comment via the plan review process (see Appendix B for more information).

The Gilliam County NHMP was approved by FEMA on August 22, 2024 and the Condon addendum was adopted via resolution on August 7, 2024. This NHMP is effective through August 21, 2029.

Mitigation Strategy

This section of the NHMP addendum addresses 44 CFR 201.6(c)(3)(iv), *Mitigation Strategy*.

During the 2024 Gilliam County NHMP update process the County and local Steering Committees re-evaluated the existing Mitigation Action Items. Following the review, actions were updated, noting what accomplishments had been made, and whether the actions were still relevant and if existing language needed to change. New action items were identified at this time (see Appendix B for more information). The City of Condon developed a list of priority actions using a modified STAPLEE process. The City’s priority actions are listed below in Table CA-1. For the complete list of actions see Appendix A and Volume I, Section 3, Table 3-2. During the plan implementation and maintenance phase action item prioritization may be modified and could use the process identified in Volume I, Section 4.

New mitigation items for 2024 were created, as well as updating the 2018 mitigation action items.

Table CA-I Condon Priority Action Items

Action Item	Action Item Title	Coordinating Organization	Timeline	Potential Funding Source*
MH #7	Work with critical businesses for backup power and internet, including gas stations and grocery stores.	Gilliam County Emergency Management	Long Term	State and Federal Funding, Partner Agencies
D #1	Improve long range water sources; increase storage through deeper wells.	City of Condon	Long Term	State and Federal Funding
DR #3	Conduct a groundwater assessment for Condon	City of Condon	Long Term	Local, Federal and State Funding
DR #4 Priority	Update the City of Condon’s water supply, including installing a new water transmission line from City Farm (well location) to the City of Condon and a new telemetry system.	City of Condon	Long Term	Local, State and Federal Funding
EQ #3	Seismically retrofit critical facilities not included in the DOGAMI 2006 assessment: South Gilliam Health Center and Condon Childcare Center.	Gilliam County Planning Department	Long Term	State and Federal Funding
FL #1 Priority	Work with the State Floodplain Manager at the Department of Land Conservation and Development (DLCD) to obtain updated floodplain information for Gilliam County and its incorporated Cities.	Gilliam County Emergency Management	Ongoing; FEMA and DLCD are currently updating	State and Federal Funding
WS #1 Priority	Work with ODOT on traffic patterns for rerouting major routes such as I-84 during winter storms, removing Highways 74 and 206 from I-84 alternate routes.	City of Condon Public Works	Short Term	Local Sources
WS #2 Priority	Conduct outreach throughout the County and incorporated cities about Winter Storm Dangers, including sidewalk maintenance during freezing rain events and protecting pipes during extreme cold periods.	Gilliam County Emergency Management	Ongoing	Local Sources
WS #3	Upgrade aging snow removal equipment.	City of Condon	Ongoing	Local and State Funding

Source: City of Condon NHMP Steering Committee, September 2023.

MH=Multi Hazard, DR=Drought, EQ=Earthquake, WS = Winter Storm, FL = Flood

**For specific funding sources, see Appendix A: Action Item Forms.

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Condon addendum to the Gilliam County NHMP. This addendum designates a coordinating body and a convener to oversee the development and implementation of action items. Because the city addendum is part of the county's multi-jurisdictional NHMP, the city will look for opportunities to partner with the county. The city's steering committee will convene after re-adoption of the City of Condon addendum on an annual schedule; the county is meeting on a semi-annual basis and will provide opportunities for the cities to report on NHMP implementation and maintenance during their meetings. The City of Condon Public Works Superintendent will serve as the convener and will be responsible for assembling the steering committee (coordinating body). The steering committee will be responsible for:

- identifying new risk assessment data,
- reviewing status of mitigation actions,
- identifying new actions, and
- seeking funding to implement the city's mitigation strategy (actions).

The convener will also remain active in the county's implementation and maintenance process (see Volume I, Section 4 for more information).

The city will utilize the same prioritization process as the county (See Volume I, Section 4: Plan Implementation and Maintenance and Volume III, Appendix D: Economic Analysis for more information).

Implementation through Existing Programs

Many of the recommendations in the Natural Hazards Mitigation Plan are consistent with the goals and objectives of the city's existing plans and policies. Where possible, the City of Condon will implement the NHMP's recommended actions through existing plans and policies. 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, allowing them to adapt to changing conditions and needs. Implementing the NHMP's action items through such plans and policies increases their likelihood of being supported and implemented. The NHMP should also be used as an essential reference document when updating plans and policies or creating new ones, in order to integrate mitigation throughout all county and city planning processes.

Condon's acknowledged comprehensive plan is the Condon Comprehensive Plan, which was most recently updated in 2015. The City implements the plan through the City Zoning Ordinances. Condon currently has the following plans, programs, and policies that relate to natural hazard mitigation. For a complete list visit the city [website](http://cityofcondon.com/): <http://cityofcondon.com/>

Table CA-2 Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name	Effects on Hazard Mitigation
Plans	Comprehensive Plan (2015)	Includes goals and policies that provide specific direction in making "quasi-judicial" land use decisions; i.e., decisions that require judgment in the application of general policies to specific situations, such as zone changes, annexations, conditional use permits and major variances.
	Water system master plan (2017)	Provides a description and analysis of water system and outlines planned improvements, including the addition of fire hydrants and a generator to power hydrants.
	Strategic Broadband Plan (2016)	Provides a description and analysis of current and desired communications capacities.
	Wastewater Collection Master Plan (2016)	Provides a description and analysis of sewer system and outlines planned improvements. Can be updated as drought conditions change.
	Public Works Standards Plan	Provides guidelines for infrastructure improvement and maintenance. It closely monitors the NHMP to make sure it is in compliance with mitigation requirements.
Policies (Municipal Codes)	City Ordinances	Guides community development, including within floodplains and regarding weed abatement and snowstorms response. Can be expanded as environmental conditions necessitate.

Table CA-3 Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Six City Council members and Mayor	Elected Office
Five member planning commission	Appointed/election volunteer commission
Staff with knowledge of land management guidelines and development practices	City Administrator/Planner
City engineer	Contracted on as necessary basis

Table CA-4 Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	Yes
Authority to levy taxes for specific purposes	Yes
Incur debt through general obligation bonds	No
Grants (state)	Yes
Collected fees: Water, sewer, host fees, Windmill SIP fees	No

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

Continued Public Participation

Keeping the public informed of the city’s efforts to reduce the city’s risk to future natural hazards events is important for successful plan implementation and maintenance. The city is committed to involving the public in the plan review and updated process. All City meetings on the Natural Hazards Mitigation Plan will be advertised and open to the public, including periodic presentations on mitigation actions at City Council Meetings. See Volume I, Section 4, for more information.

Plan Maintenance

The Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan and city addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the city will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community’s demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

Risk Assessment

This section of the NHMP addendum 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 hazard 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 local level rationale for the identified mitigation strategies (action items) is presented herein, and within Section 2, *Risk Assessment*, and Appendix B, *Community Profile*. The risk assessment process is graphically depicted in Figure CA-1 below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure CA-1 Understanding Risk



Community Asset Identification

This section provides information on city specific assets. For additional information on the characteristics of Condon, in terms of geography, environment, population, demographics, employment and economics, as well as housing and transportation see Volume III, Appendix C, *Community Profile*. Many of these community characteristics can affect how natural hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the city specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Community Characteristics

Condon is located in south-central Gilliam County where highways 19 and 206 intersect, in an area dominated by wheat fields and grass farms. State Highway 19 is the major north-south route connecting Arlington with Condon, while State Highway 206 connects Condon with communities to the east and west. Condon is about 0.83 square miles, and has an elevation of 2,800 feet.^{1,2} The climate of Condon is characterized by dry, warm summers and cold winters; the average monthly temperatures range from 49-84 degrees in July and August, and 22-39 degrees in December and January. The city receives approximately 14.81 inches of rain and 27 inches of snow each year³. Monthly precipitation is about 1-1.5 inches during the wetter months of November – March, and average about 0.5 inches during the drier months of June - September. The city's topography is primarily flat and open, and one creek runs through city boundaries.

Condon is the County seat, and contains most county services, including the pharmacy, agriculture extension services, Department of Health and Human Services, and Gilliam County Sheriff's Office. Of note, Condon contains the County's primary grocery store. Groceries are delivered twice each week, if I-84 closes, truck deliveries are disrupted and grocery stocks ran low.

Economy

The median household income in Condon is \$38,594, slightly lower than that of Gilliam County and significantly lower than the state (\$75,657).⁴ Condon's primary industries are Public Administration, Health Care & Social Assistance and Accommodation & Food Services.⁵ The highest paying industries are Professional, Scientific & Management, Administrative & Waste Management Services, Educational Services and Information. The unemployment rate is low: 4.3%.

Population Characteristics

The total population of Condon is 711 people.⁶ 48.2% of the Condon population is over 65 years old, and 8.3% is under 18 years old. Roughly 19.1% of the population lives below the federal poverty level.⁷ It should be noted that Census data can be inaccurate at the small city level. 90% of the population lives in the same house as a year ago, and almost ten percent moved within the County or within the State, indicating high stability. The City is experiencing higher incoming migration than in previous years, indicated by quick house sales. The majority of Condon houses were built before 1990 (75.7%) and 62.5% were built before 1960, indicating high seismic vulnerability. Of the 461 housing units in Condon, 18% are vacant.⁸

¹ Gilliam County Community Wildfire protection Plan 2022

² Gilliam County Wildfire Protection Plan, 2022

³ Western Regional Climate Center, "Condon, OR (35175)". Retrieved July 20, 2023. <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?or1765>

⁴ 2020 Decennial Census, Condon city, OR Profile; U.S. Census Bureau https://data.census.gov/profile/Condon_city,_Oregon?g=160XX00US4115000

⁵ Condon, OR Data USA Retrieved July 20, 2023. <https://datausa.io/profile/geo/condon-or>

⁶ 2020 Decennial Census, Condon city, OR Profile; U.S. Census Bureau https://data.census.gov/profile/Condon_city,_Oregon?g=160XX00US4115000

⁷ American Community Survey 5-year estimates; Social Explorer Table S1701; U.S. Census Bureau

⁸ American Community Survey 5-Year estimates, Social Explorer Table DP04; U.S. Census Bureau

Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets that may be affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

The asset inventory delineates the City's existing building and infrastructure assets in detail in Table CA-5.

Table CA-5 Condon Critical Facilities and Infrastructure

Facility Name	Facility Type
Condon Elementary School (built in 2021)	Educational
Condon High School (built in 1962)	Educational
City Hall	Government
South Gilliam Co. Rural Fire Protection District and EMS Station	Emergency Response
South Gilliam County Health Center	Care Facility
Frontier Regional 911	Emergency Response
Water System	Utilities
Wastewater Treatment	Utilities

Source: Condon Steering Committee, June 2023

See hazard sections below and Section 2, *Risk Assessment*, for potential hazard vulnerabilities to these facilities.

Hazard Analysis

Hazard Analysis Methodology

This NHMP utilizes a hazard analysis methodology that was first developed by FEMA circa 1983, and gradually refined by the Oregon Military Department's Office of Emergency Management (OEM) over the years.

The methodology produces scores that range from 24 (lowest possible) to 240 (highest possible). Vulnerability and probability are the two key components of the methodology. Vulnerability examines both typical and maximum credible events, and probability endeavors to reflect how physical changes in the jurisdiction and scientific research modify the historical record for each hazard. Vulnerability accounts for approximately 60% of the total score, and probability approximately 40%.

This method provides the jurisdiction with a sense of hazard priorities, or relative risk. It doesn't predict the occurrence of a particular hazard, but it does "quantify" the risk of one hazard compared with another. By doing this analysis, planning can first be focused where the risk is greatest.

In this analysis, severity ratings, and weight factors, are applied to the four categories of history, vulnerability, maximum threat (worst-case scenario), and probability as shown in the table below. See Volume I, Section 2 (Risk Assessment) for more information.

City of Condon Hazard Analysis

The Condon steering committee developed their hazard vulnerability assessment (HVA), using the county’s HVA as a reference. Changes from the county’s HVA were made where appropriate to reflect distinctions in vulnerability and risk from natural hazards unique to Condon, which are discussed throughout this addendum.

Table CA-6 shows the HVA matrix for Condon showing each hazard listed in order of rank from high to low. For local governments, conducting the hazard analysis is a useful step in planning for hazard mitigation, response, and recovery. The method provides the jurisdiction with sense of hazard priorities, but does not predict the occurrence of a particular hazard.

Extreme weather was the top hazard threat to Condon, followed closely by winter storm. The Earthquakes and windstorm hazards comprise the next highest ranked hazards, while drought, flood, wildfire and volcano hazards comprise the lowest ranked hazards.

Table CA-6 Hazard Analysis Matrix – Condon

Hazard	History	Probability	Vulnerability	Maximum Threat	Total	Rank	Risk Level
Extreme Weather	9	10	9	10	233	1	High
Winter Storms/Landslides	8	10	9	10	231	2	High
Earthquakes	1	5	3	5	152	3	Moderate
Windstorms	6	6	3	6	147	4	Moderate
Drought	2	5	3	8	127	5	Low
Floods	4	4	3	4	119	6	Low
Wildfire	1	2	4	7	106	7	Low
Volcanic Events	1	3	4	6	103	8	Low

Source: Condon NHMP Steering Committee, 2024.

Table CA-7 categorizes the probability and vulnerability scores from the hazard analysis for the city and compares the results to the assessment completed by the Gilliam County NHMP Steering Committee (areas of differences are noted with **bold** text within the city ratings). The city ranked their vulnerability to earthquakes, windstorm, drought, flood and wildfire as lower than the county, and their vulnerability to volcanic events higher. Condon ranked their probability of windstorm, drought flood and wildfire as lower than the County.

Table CA-7 Probability and Vulnerability Comparison

Hazard	City of Condon		Gilliam County	
	Probability	Vulnerability	Probability	Vulnerability
Extreme Weather	High	High	High	High
Winter Storm/Landslide	High	High	High	High
Earthquake	Moderate	Low	Moderate	Moderate
Windstorm	Moderate	Low	High	Moderate
Drought	Moderate	Low	High	High
Flood	Moderate	Low	High	Moderate
Wildfire	Low	Moderate	High	High
Volcanic Event	Low	Moderate	Low	Low

Source: Condon NHMP Steering Committee and Gilliam County NHMP Steering Committee, 2023.

Hazard Probability:

Compared to Gilliam County, the hazard analysis for the City of Condon identified zero hazards with *higher* probability.

The City of Condon and Gilliam County identified *equal* probability for future occurrences of hazards that include:

- Extreme Weather
- Winter Storm/Landslide
- Earthquake
- Volcanic Event

The hazard analysis for the City of Condon identified *lower* probability of drought hazard compared to Gilliam County. Although droughts commonly occur throughout Gilliam County and the surrounding region, the hazard has had little or no effect of the City. The City has neither restricted water usage because of a drought nor requested assistance from other jurisdictions to respond to a drought. Therefore, the probability of a drought hazard impacting the City is lower than the County.

Because the City’s elevation (approximately 2,000-feet), terrain, and location on the flats of the Columbia Plateau, the probability of a flood is less likely in the City compared to other parts of Gilliam County.

Because the City is located in a flat area with good defensible space and low wildfire history, the probability of wildfire is lower than other areas within Gilliam County.

While the City experiences high winds, they are further from the Columbia River Gorge and their infrastructure is built to withstand high winds, the probability of a windstorm is lower than other areas of the county.

Community Vulnerability:

Compared to Gilliam County, the hazard analysis for the City of Condon identified *higher* vulnerability to volcanic events. The City experienced ash fallout in 1980 from the eruption of Mount St. Helens. Ash fallout can disrupt or damage transportation systems, electrical systems, water systems, and wastewater systems, and can also effect populations, particularly people with chronic respiratory problems.

The City of Condon and Gilliam County identified *equal* vulnerability to the following hazards:

- Extreme Weather
- Winter Storm/Landslide

The hazard analysis for the City of Condon identified the remaining five hazards with *lower* vulnerability compared to Gilliam County:

- Earthquake
- Windstorm
- Drought
- Flood
- Wildfire

Areas throughout Gilliam County, particularly the northern part, generally have higher ground shake amplification, liquefactions, and earthquake-induced landslides than the City of Condon. Also, because there is no written history of previous earthquake occurrences documented in Gilliam County, the city rated the vulnerability of an earthquake lower than the county.

Because of its elevation and location, the City of Condon regularly experiences windstorms, some of which have the potential to cause injuries and damage to property, but less so here than in other areas of the county.

Drought regularly occurs in Gilliam County, but the city of Condon has never experienced negative effects to their water supply or day to day operations.

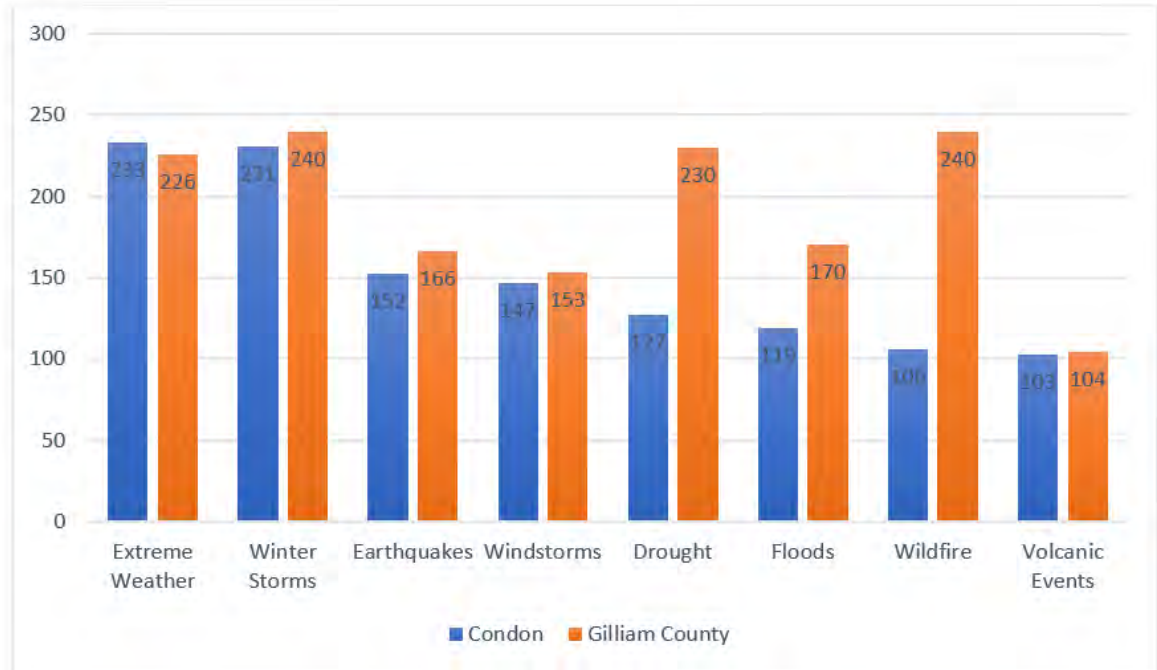
Flash flooding during the dry, summer months can also impact the City of Condon. The City also has a high percentage of elderly population compared to the county.

The City rated the vulnerability to wildfire low based off of previous events that have occurred and the impacts they had to the City.

Hazard Comparison Summary

Figure CA-2 presents a summary of the hazard analysis for the City of Condon and compares the results to the assessment completed by Gilliam County. The city rated their threat from all hazards as either lower than or the same as the county.

Figure CA-2 Overall Hazard Analysis Comparison–Gilliam County/Condon



Source: City of Condon NHMP Steering Committee and Gilliam County NHMP Steering Committee

Hazard Characteristics and Impact

Please review the Risk Assessment (Volume I, Section 2) for additional information on each hazard.

Drought

The steering committee determined that the city’s probability for drought is **moderate** (which is lower than the county’s rating) and that their vulnerability to drought is **low** (which is lower than the county’s rating).

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of drought hazards, as well as the location and extent of a potential event. Moderate droughts occur regularly in Gilliam County, primarily impacting the agricultural industry and increasing the risk of wildfire. Residents recall one instance, ten-fourteen years ago, during which water was rationed for a month. Otherwise, droughts have had no affect on the city.

Condon’ primary water supply comes from surface affected groundwater. The City contains eight wells and spring, with a total storage capacity of 850,000 gallons. Condon does not have a water treatment plan, but treats water with chlorine. In general, water supply is available and sufficient.

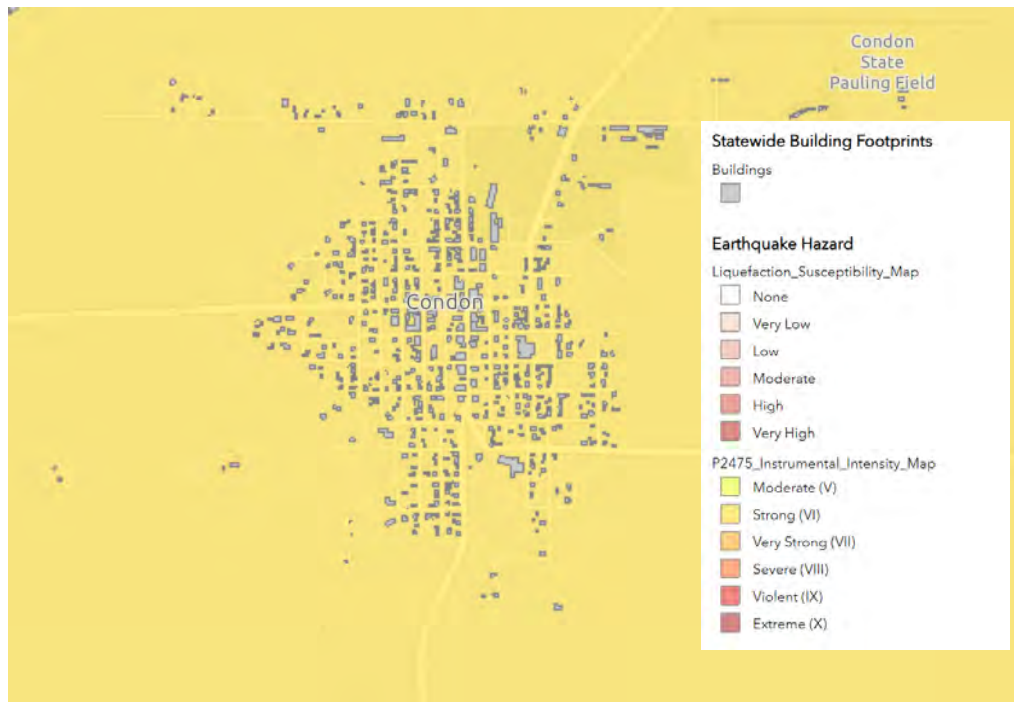
Earthquake

The steering committee determined that the city’s probability for an earthquake event is **moderate** (which is the same as the county’s rating) and that their vulnerability is **low** (which is lower than the county’s rating).

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of earthquake hazards, history, as well as the location and extent of a potential event. Generally, an event that affects the county is likely to affect Condon similarly. Some residents recall experiencing mild tremors. The liquefaction potential in Condon is low to none, and expected shaking is moderate for both a CSZ and local events. The causes and characteristics of an earthquake event are appropriately described within the county’s plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the county’s plan. The community impacts described by the county would occur in Condon to a similar extent.

Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any particular site. In many major earthquakes, damages have primarily been caused by the behavior of the soil. Condon has no soft-soil hazard, so damage potential is low.

Figure CA-3 Expected Shaking and Soft Soils



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI), accessed on 1/2/2024

As noted in the community profile approximately 75.7% of residential buildings were built prior to 1990, which increases the city’s vulnerability to the earthquake hazard. Information on specific public buildings’ (schools and public safety) estimated seismic resistance, determined by DOGAMI in 2006, is shown in Table CA-9; each “X” represents one building within that ranking category. Of the facilities evaluated by DOGAMI using RVS, two (2) have a very high (100% chance), one (1) has a high (>10%), and one (1) has a moderate (1-10%) collapse potential. Of note, the South Gilliam County Rural Fire Protection District has been

rebuilt since the DOGAMI RVS inspection, as has the Condon Elementary School. Also, the City of Condon, VFD/PD is now an unused building.

Table CLA-8 Rapid Visual Survey Scores

Facility	Address	Site ID*	Level of Collapse Potential			
			Low (< 1%)	Moderate (>1%)	High (>10%)	Very High (100%)
Public Safety						
City of Condon VFD/PD	128 S Main St	Gill_fir01			X,X	
South Gilliam County RFPD**	200 N Main St	Gill_fir04	X			
Gilliam County Sheriff's Office	221 S Oregon St	Gill_pol03				X
Schools						
Condon Elementary School**	220 S East St	Gill_sch04	X		X	X
Condon High School	210 E Bayard St	Gill_sch01		X, X		

Source: DOGAMI 2007. Open File Report 0-07-02. Statewide Seismic Needs Assessment Using Rapid Visual Assessment.

** – Site ID is referenced on the RVS Gilliam County Map

*** Indicates building has been retrofit or rebuilt since 2007 Rapid Visual Assessment

Flood

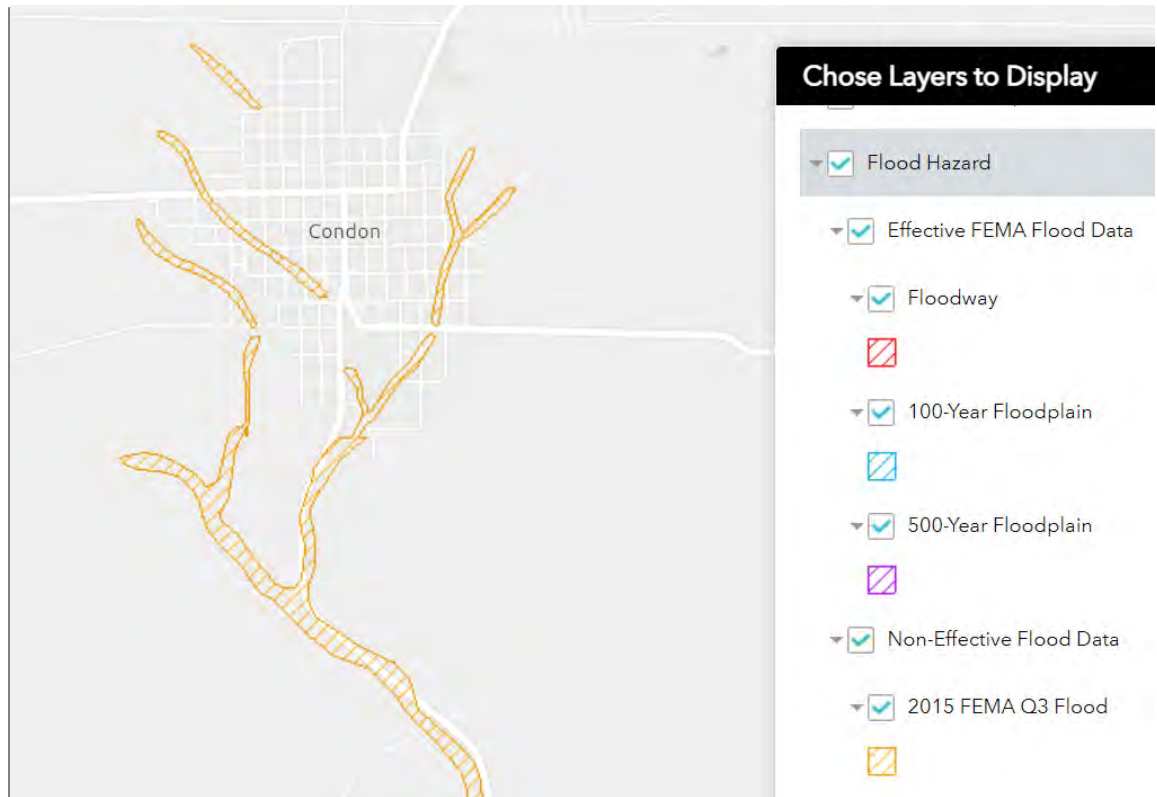
The steering committee determined that the city’s probability for flood is **moderate** (which is lower than the county’s rating) and that their vulnerability to flood is **low** (which is lower than the county’s rating).

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of flooding hazards within the region, as well as previous flooding occurrences. General flood-related community impacts are adequately described within the Flood Hazard Annex of Gilliam County’s Natural Hazards Mitigation Plan. Portions of Condon have areas of floodplains (special flood hazard areas). These include areas along Condon Canyon drainage ditch (see Figure CA-4). However, damage from floods has been negligible historically.

Flood impacts in Condon have included minimal road damage and no property damage. Flooding occurs every five to ten years, and every five years the city experiences flash floods that wash down Main Street. However, the City has good drainage so impacts are negligible. However, in 2023 several buildings on Main Street flooded during a heavy rain event due to improperly installed sidewalks, which have since been repaired. The primary impact is the labor needed to move mud off of paved roads.⁹

⁹City of Condon Steering Committee, September 2023

Figure CA-4 Special Flood Hazard Area



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI) accessed on 1/02/2024

National Flood Insurance Program (NFIP)

FEMA has not modernized the Condon Flood Insurance Rate Maps (FIRMs) since 1983, and is currently in the process of updating the FIRMS having started in 2023. Table CA-10 shows that as of January 2024, Condon has no National Flood Insurance Program (NFIP) policies in force. Neither Condon nor Gilliam County is a member of the Community Rating System (CRS). There has been a total of one (1) paid claim in the County, and none in the City of Condon. The Community Repetitive Loss record for Condon identifies no Repetitive Loss Properties¹⁰ and no Severe Repetitive Loss Properties¹¹.

¹⁰ A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

¹¹ A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding \$5,000 and with cumulative amount of such claims payments exceeding \$20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Table CA-10 Flood Insurance Detail

Jurisdiction	Effective FIRM and FIS	NFIP Policies	Insurance in Force	Total Paid Claims	Total Paid Amount
Gilliam County	9/24/1984	4	\$1,105,000	1	\$1,156
Condon	9/24/1984	0	\$0	0	\$0

Source: Dave Lentzer, Department of Land Conservation and Development, February 2018.

Volcanic Event

The steering committee determined that the city’s probability for volcanic event is **low** (which is the same as the county’s rating) and that their vulnerability to volcanic event is **moderate** (which is higher than the county’s rating).

Volume I, Section 2, *Risk Assessment*, adequately describes Condon’s risk to volcanic events. Generally, an event that affects the county is likely to affect Condon as well. The causes and characteristics of a volcanic event are appropriately described within the county’s plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the county’s plan, and the community impacts described by the county would generally be the same for Condon as well. Condon is very unlikely to experience anything more than volcanic ash during a volcanic event, but ash is likely to fall on all residents. When Mt. Saint Helens erupted in 1980, Condon received ash fall that caused minor property damage.

Wildfire

The steering committee determined that the city’s probability for wildfire is **low** (which is lower than the county’s rating) and that their vulnerability to wildfire is **moderate** (which is lower than the county’s rating).

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of wildfires, as well as the county and city’s history of wildfire events. Only rarely have wildfires come into or near the City of Condon. Wildfires threaten the city once every twenty to thirty years. Residents maintain good defensible space. Fires from other locations do affect air quality in Condon; the 2017 fires caused residents to stay indoors for a week and the 2020 fires kept residents indoors for a similar time period. The location and extent of wildfires vary depending on fuel, topography, and weather conditions; dry vegetation and constant wind heighten Condon’s risk, but flat topography and good defensible space lower risk as well.

The potential community impacts and vulnerabilities described in the county’s NHMP are generally accurate for the city as well. Gilliam County developed a Community Wildfire Protection Plan (CWPP) in 2022, which describes how summer weather, terrain, crops and natural vegetation of Gilliam County lends itself to the ongoing problem of wildfires throughout the County. The Gilliam County CWPP provides some risk and vulnerability information related to Condon that has been incorporated into this plan as applicable.¹²

¹²Gilliam County Wildfire Protection Plan, 2022.

Windstorm

The steering committee determined that the city's probability for windstorm is **moderate** (which is lower than the county's rating) and that their vulnerability to windstorm is **low** (which is lower than the county's rating).

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of windstorms, as well as the location and extent of windstorm hazards. The region's (and city's) history of events is adequately described within the county's plan as well. Because windstorms typically occur during winter months, they are sometimes accompanied by ice, freezing rain, flooding, and snow. For the purposes of this plan, windstorms are considered an individual hazard, distinct from winter storms. Alone, they have much lower potential to affect the City. Windstorm events have damaged roofs and downed trees, and occasionally broken utility poles. Condon experiences wind related power outages twice annually.

Gilliam County's plan adequately describes the impacts caused by windstorms, including power outages, downed trees, and storm-related debris.

Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all residential and critical facilities and infrastructure within Condon are at risk.

Winter Storm

The steering committee determined that the city's probability for winter storm is **high** (which is the same as the county's rating) and that their vulnerability to winter storm is **high** (which is the same than the county's rating).

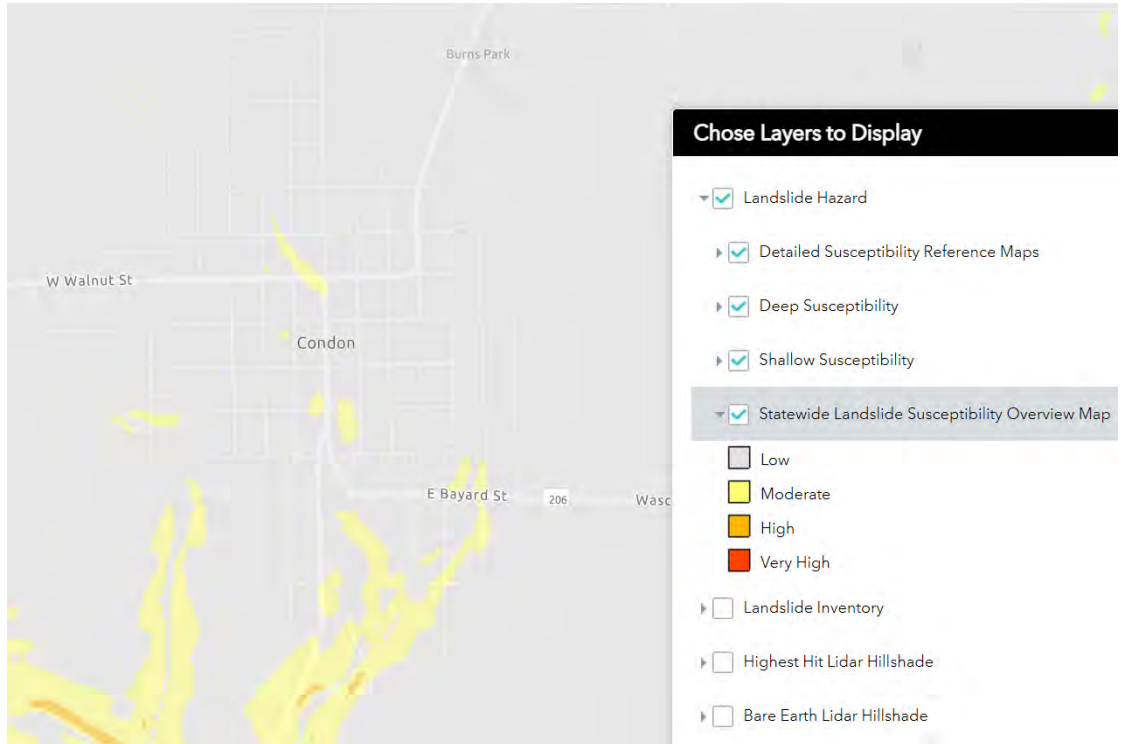
Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of winter storms, as well as the location and extent of winter storm hazards. In general, Condon experiences more rain and higher severity of winter storm impacts. The region's (and city's) history of events is adequately described within the county's plan. Severe winter storms can consist of rain, freezing fog, freezing rain, ice, snow, extreme cold, sleet, and wind. These storms are most common from November through March and are an annual to biannual occurrence.

Major winter storms can and have occurred in the Condon area, and while they typically do not cause significant damage, they are frequent and have the potential to impact economic activity by keeping residents from their jobs. The most common impact of winter storms is property damage in the form of frozen pipes. In decades past, Condon experienced several day long power outages, but recent upgrades to electrical infrastructure solved the issue. Currently, power outages occur once yearly for an average of twenty minutes. Tree limbs may break and damage property as a result of winter storms, and snow drifts can over burden roofs. County and state roads close every few years due to snow drifts. A primary vulnerability of residents is the distance to medical facilities, especially given the significant elderly population.

Landslides

Like Gilliam County, Condon does not experience significant landslides or consider them a substantial hazard. Landslide susceptibility exposure for Condon is shown in Figure CA-5. Approximately 94.8% of Condon has Low landslide susceptibility. The remaining 5.2% is rated “moderate.”¹³

Figure CA-5 Landslide Susceptibility Exposure



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI) accessed on 1/02/2024

Potential landslide-related impacts are described within the county’s NHMP, and include infrastructural damages, economic impacts (due to isolation and/or arterial road closures), property damages, and obstruction to evacuation routes.

¹³DOGAMI Open-File Report, O-16-02, Landslide Susceptibility Overview Map of Oregon

Extreme Weather

The steering committee determined that the city's probability for extreme weather is **high** (which is the same as the county's rating) and that their vulnerability to extreme weather is **high** (which is the same than the county's rating).

Volume I, Section 2, Risk Assessment, adequately describes the causes and characteristics of extreme weather. In general, Condon experiences extreme heat, extreme cold and summer rain/hailstorm impacts. The region's (and city's) history of events is adequately described within the county's plan. Extreme weather can consist of extreme heat events, extreme cold events and summer storms including hail. Extreme heat and cold are annual to biannual occurrences, with hail storms being very infrequent, with several years in between significant events.

Extreme heat events can and have occurred in the Condon area, and while they typically do not cause significant damage, they are frequent and have the potential to impact residents. Condon Citizens expect extreme temperatures annually, and for the most part are prepared for extreme heat an extreme cold.

A primary vulnerability of Condon is the significant number of elderly residents who are more vulnerable to extreme temperatures.

In 1975 and 1995, the City experienced brief, intense hailstorms, both during summer. The hailstorms lasted 10-15 minutes, and deposited hail that was large enough to damage property. After the 1995 event, the majority of City residents replaced their roofs. Windows were broken as well. These events occurred during the sumer and fall under extreme weather.

CITY OF LONEROCK ADDENDUM

Purpose

This document serves as the City of Lonerock's Addendum to the Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan (NHMP). This addendum supplements information contained in Volume I (Basic Plan) of this NHMP, which serves as the foundation for this jurisdiction's addendum, and Volume III (Appendices), which provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the NHMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation*.

In April 2023 Gilliam County Emergency Management hired Fair Winds Consulting, LLC to update their NHMP, which expired January 16, 2024. This NHMP update is multi-jurisdictional, and includes Gilliam County and the Cities, including City of Arlington, Condon, and Lonerock. This project is funded through the Federal Emergency Management Agency's Hazard Mitigation Grant Program, FEMA Award number DR-4599-OR to the State of Oregon. Gilliam County received a sub-grant through the State of Oregon, HMGP Sub-Grant 4599-02. Gilliam County solicited for a contractor to write the plan and entered into an agreement with Fair Winds Consulting, LLC in April 2023.

To be eligible to receive certain pre- and post-disaster natural hazard mitigation funds from FEMA, local governments must have a current, FEMA-approved NHMP. NHMPs must be updated and re-approved every five years. By developing this addendum to the Gilliam County NHMP, locally adopting it, and having it approved by FEMA, the City of Lonerock will maintain eligibility for FEMA Hazard Mitigation, Building Resilient Infrastructure, and Communities, and Flood Mitigation Assistance grant program funds.

The Gilliam County NHMP, and Lonerock Addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. The project Steering Committee guided the process of developing the plan. For more information on the composition of the Steering Committee see *Planning and Public Process* (Volume III, Appendix B).

The Mayor of Lonerock is the designated local convener and will take the lead in implementing, maintaining, and updating the addendum to the NHMP in collaboration with the designated convener of the Gilliam County NHMP (County Emergency Management).

Representatives from the City of Lonerock Steering Committee convened on the following occasions (see Appendix B for more information):

- June 1, 2023 - Gilliam County NHMP Steering Committee Meeting #1
- October 8, 2023 – Lonerock Steering Committee Meeting
- November 6, 2023 – Gilliam County NHMP Steering Committee Meeting #2

The City’s addendum reflects decisions decided upon at these NHMP meetings and during subsequent work and communication with NHMP Update Coordinator.

The Lonerock Steering Committee was comprised of the following representatives:

- Convener: Stan Forrest, Mayor of Lonerock
- Chris Fitzsimmons, Gilliam County Emergency Management
- Andrew Beebe, Lonerock City Council
- Tammy Forrest, Citizen
- Donna Lopiparo, Citizen
- Cori Mikkalo, Fair Winds Consulting, LLC

Public participation was achieved with the establishment of the Steering Committee, which was comprised of city officials and citizens representing different organizations and sectors. The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan’s development. In addition, community members outside of the Steering Committee were provided an opportunity for comment via the plan review process (see Appendix B for more information).

The Gilliam County NHMP was approved by FEMA on August 22, 2024 and the Lonerock addendum was adopted via resolution on August 5, 2024. This NHMP is effective through August 21, 2019.

Mitigation Strategy

This section of the NHMP addendum addresses 44 CFR 201.6(c)(3(iv), *Mitigation Strategy*.

During the 2024 Gilliam County NHMP update process the County and local Steering Committees re-evaluated the existing Mitigation Action Items. Following the review, actions were updated, noting what accomplishments had been made, and whether the actions were still relevant and if existing language needed to change. New action items were identified at this time (see Appendix B for more information). The City of Lonerock developed a list of priority actions using a modified STAPLEE process. The City’s priority actions are listed below in Table LA-1. For the complete list of actions see Appendix A and Volume I, Section 3, Table 3-2. During the plan implementation and maintenance phase action item prioritization may be modified and could use the process identified in Volume I, Section 4.

Table LA-I Lonerock Priority Action Items

Action Item	Action Item Title	Coordinating Organization	Timeline	Potential Funding Source*
MH #12 Priority	City of Lonerock: Install a generator at Lonerock Community center to serve as a resilience center to provide shelter and resources during climate and other emergencies.	City of Lonerock	Long Term (3-5 years)	State and Federal Funding
WF #2 Priority	Create firebreaks around vulnerable facilities through fire resistant plants, hardscaping or through vegetation management. Purchase equipment and supplies for establishing fuel breaks, including irrigation type water line, vegetation management equipment.	City of Lonerock, Gilliam County Fire Services	Ongoing	Local, State and Federal Funding
WF #11 Priority	Conduct weed abatement to reduce wildfire risk through maintenance of yard and roadside vegetation in the City of Lonerock.	City of Lonerock	Ongoing	Local Sources, State and Federal Funding

Source: City of Lonerock NHMP Steering Committee, October 2023.

MH= Multi-Hazard WF=Wildfire

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Lonerock addendum to the Gilliam County NHMP. This addendum designates a coordinating body and a convener to oversee the development and implementation of action items. Because the City of Lonerock’s addendum is part of the County’s multi-jurisdictional NHMP, the City will look for opportunities to partner with the County. The City’s steering committee will convene after re-adoption of the City of Lonerock addendum on an annual schedule; the County is meeting on a semi-annual basis and will provide opportunities for the Cities to report on NHMP implementation and maintenance during their meetings. The City Mayor will serve as the convener and will be responsible for assembling the Steering Committee (coordinating body). The steering committee will be responsible for:

- identifying new risk assessment data,
- reviewing status of mitigation actions,
- identifying new actions, and
- seeking funding to implement the city’s mitigation strategy (actions).

The convener will also remain active in the County’s implementation and maintenance process (see Volume I, Section 4 for more information).

The City will utilize the same prioritization process as the county (See Volume I, Section 4: Plan Implementation and Maintenance and Volume III, Appendix D: Economic Analysis for more information).

Implementation through Existing Programs

Lonerock relies on the County and State plans, codes, and ordinances to guide and regulate development. Implementing the NHMP's action items through such plans and policies increases their likelihood of being supported and implemented. Lonerock currently has the following plans, programs, and policies that relate to natural hazard mitigation:

- Planning Commission (at County)
- Building Codes (at County)
- Transportation Plan (at County)

The City of Lonerock's personnel are primarily volunteers. One part time administrator supports the volunteer city council. Fire services are also volunteer-based. Mapping, planning, and building is conducted by County staff, state personnel, or contracted consultants. If the City decides to implement any plans or policies, they should use the NHMP as a reference document. The City's income includes host fees from waste management facilities, water fees, and the cigarette/alcohol tax. Due to their small size, Lonerock has a very limited ability to expand their regulations or services.

Continued Public Participation

Keeping the public informed of the City's efforts to reduce the City's risk to future natural hazards events is important for successful plan implementation and maintenance. The City is committed to involving the public in the plan review and updated process. All City meetings on the Natural Hazards Mitigation Plan will be advertised and open to the public, including periodic presentations on mitigation actions at City Council Meetings. See Volume I, Section 4, for more information.

Plan Maintenance

The Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan and the City addendums for Arlington, Lonerock and Condon will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the County plan update process, the City will also review and update its addendum. The convener will be responsible for convening the Steering Committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?

- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the Steering Committee determine what components of the mitigation plan need updating. The Steering Committee will be responsible for updating any deficiencies found in the plan.

Risk Assessment

This section of the NHMP addendum 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 hazard 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 local level rationale for the identified mitigation strategies (action items) is presented herein, and within Section 2, *Risk Assessment*, and Appendix B, *Community Profile*. The risk assessment process is graphically depicted in Figure LA-1 below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure LA-1 Understanding Risk



Community Asset Identification

This section provides information on City specific assets. For additional information on the characteristics of Lonerock, in terms of geography, environment, population, demographics,

employment and economics, as well as housing and transportation see Volume III, Appendix C, *Community Profile*. Many of these community characteristics can affect how natural hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the City specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation. For all Community Characteristics, it should be noted that census data can be inaccurate at the small city level.

Community Characteristics

Lonerock is located at the south eastern border of Gilliam County at 2800 feet elevation. The City lies in a valley and is surrounded by ranches and wheat fields; the area includes some sparsely wooded sections. No major highways pass through or near the City, and Lonerock is 21 miles from Condon, the County seat. The City is located on 1.01 square miles.¹ The climate of Lonerock is characterized by dry, warm summers and cold winters; the average monthly temperatures fall approximately five degrees below nearby Condon's, which range from 49-84 degrees in July and August, and 23-39 degrees in December and January.² Of the 23 housing units in Lonerock, 11, or 48% are vacant.³

Economy

Lonerock does not have a recorded median household income; Gilliam county has a median household income of \$51,705, significantly lower than the State of Oregon (\$75,657).⁴ Agriculture, fishing, hunting, mining and Construction the vast majority of jobs for the City, though a majority of the population is retired.⁵ The unemployment rate is not able to be measured on a the small scale of Lonerock. However, local officials confirm that few to no jobs exist in Lonerock, and most employed residents commute elsewhere for work.

Population Characteristics

According the Population Research Center of Portland State University, the total population of Lonerock is 25 people.⁶ Nearly two thirds, 61% of the Lonerock population is over 65 years old. According to American Community Survey estimates, no residents are under 35 years of age. Poverty estimates at such small scale are unreliable, but according to the 2022 American Community Survey, none of the population lives below the federal poverty level. The City has very high geographic stability, with nearly 100% of residents residing in the same house as one year ago.

¹ Gilliam County Community Wildfire Protection Plan 2022

² Western Regional Climate Center, "Condon, OR (35175)". Retrieved May 2023. <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?or1765>

³ Social Explorer Tables: ACS 2022(5-Year Estimates) (SE), Social Explorer DP04; U.S. Census Bureau

⁴ ACS 2021 (5-Year Estimates) (SE), Social Explorer Table 1901; U.S. Census Bureau

⁵ 2020 Census; Lonerock city, Oregon profile; U.S. Census Bureau

⁶ Portland State University Population Research Center, Cities 2020.

⁷ ACS 2022 (5-Year Estimates), Social Explorer Table S2502; U.S. Census Bureau

Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets that may be affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

The asset inventory delineates the City’s existing building and infrastructure assets in detail in Table LA-2.

Table LA-2 Lonerock Critical Facilities and Infrastructure

Facility	Facility Type
Lonerock Community Hall	Community
Fire Station/Outpost	Emergency Response
Water System	Utilities
Lonerock Bridge	Bridge / Transportation

Source: Lonerock Steering Committee, October 2023

See hazard sections below and Section 2, *Risk Assessment*, for potential hazard vulnerabilities to these facilities.

Hazard Analysis Methodology

This NHMP utilizes a hazard analysis methodology that was first developed by FEMA circa 1983, and gradually refined by the Oregon Military Department’s Office of Emergency Management (OEM) over the years.

The methodology produces scores that range from 24 (lowest possible) to 240 (highest possible). Vulnerability and probability are the two key components of the methodology. Vulnerability examines both typical and maximum credible events, and probability endeavors to reflect how physical changes in the jurisdiction and scientific research modify the historical record for each hazard. Vulnerability accounts for approximately 60% of the total score, and probability approximately 40%.

This method provides the jurisdiction with a sense of hazard priorities, or relative risk. It doesn't predict the occurrence of a particular hazard, but it does "quantify" the risk of one hazard compared with another. By doing this analysis, planning can first be focused where the risk is greatest.

In this analysis, severity ratings, and weight factors, are applied to the four categories of history, vulnerability, maximum threat (worst-case scenario), and probability as shown in the table below. See Volume I, Section 2 (Risk Assessment) for more information.

Hazard Analysis

The Lonerock Steering Committee developed their hazard vulnerability assessment (HVA), using the county’s HVA as a reference. Changes from the county’s HVA were made where appropriate to reflect distinctions in vulnerability and risk from natural hazards unique to Lonerock, which are discussed throughout this addendum.

Table LA-3 shows the HVA matrix for Lonerock showing each hazard listed in order of rank from high to low. For local governments, conducting the hazard analysis is a useful step in planning for hazard mitigation, response, and recovery. The method provides the jurisdiction with sense of hazard priorities, but does not predict the occurrence of a particular hazard.

The Lonerock Steering Committee agreed that few hazards significantly affected the community. The community is highly self-sufficient, and determined most hazards as moderate or low risk. Wildfire is the highest ranked hazard, closely followed by Winter storm as the second highest. Windstorms are the only moderate risk hazard, and extreme weather, earthquake, drought, flood and volcanic events comprise the lowest ranked hazards.

Table LA-3 Hazard Analysis Matrix – Lonerock

Hazard	History	Probability	Vulnerability	Maximum Threat	Total	Rank	Risk Level
Wildfire	8	10	10	10	236	1	High
Winter Storms/ Landslides	6	10	4	10	202	2	High
Windstorms	1	6	3	8	139	3	Moderate
Extreme Weather	2	5	3	7	124	4	Low
Earthquakes	2	2	5	8	123	5	Low
Drought	1	1	2	10	119	6	Low
Flood	7	8	2	2	100	7	Low
Volcanic Events	1	1	2	3	49	8	Low

Source: Lonerock NHMP Steering Committee, 2023.

Table LA-4 categorizes the probability and vulnerability scores from the hazard analysis for the City and compares the results to the assessment completed by the Gilliam County NHMP Steering Committee (areas of differences are noted with **bold** text within the city ratings). The City ranked their probability of windstorm, extreme weather, earthquake and drought as lower, and their vulnerability to a winter storm, windstorm, extreme weather, drought and flood as lower.

Table LA-4 Probability and Vulnerability Comparison

Hazard	City of Lonerock		Gilliam County	
	Probability	Vulnerability	Probability	Vulnerability
Wildfire	High	High	High	High
Winter Storm/Landslide	High	Moderate	High	High
Windstorm	Moderate	Low	High	Moderate
Extreme Weather	Moderate	Low	High	High
Earthquake	Low	Moderate	Moderate	Moderate
Drought	Low	Low	High	High
Flood	High	Low	High	Moderate
Volcanic Event	Low	Low	Low	Low

Source: Lonerock NHMP Steering Committee and Gilliam County NHMP Steering Committee, 2023.

Hazard Probability:

Compared to Gilliam County, the hazard analysis for the City of Lonerock identified zero hazards with *higher* probability.

The City of Lonerock and Gilliam County identified *equal* probability for future occurrences to four hazards that include:

- Wildfire
- Winter Storm/Landslide
- Flood
- Volcanic Event

The hazard analysis for the City of Lonerock identified *lower* probability to the remaining four hazards compared to Gilliam County:

- Windstorm
- Extreme Weather
- Earthquake
- Drought

The City has two wells, three springs, and four fire hydrants. Therefore, the probability of a drought impacting residents is lower compared to the County.

Because there is no written history of previous earthquake occurrences documented in Gilliam County, the City rated the probability of an earthquake as low.

Community Vulnerability:

Compared to Gilliam County, the hazard analysis for the City of Lonerock identified *higher* vulnerability to zero hazards.

Because the population of Lonerock is accustomed to self-sufficiency, they rely on external services to a lesser extent than the rest of the County.

The City of Lonerock and Gilliam County identified *equal* vulnerability to three hazards:

- Wildfire
- Earthquake
- Volcanic Event

The hazard analysis for the City of Lonerock identified the following hazards with *lower* vulnerability compared to Gilliam County:

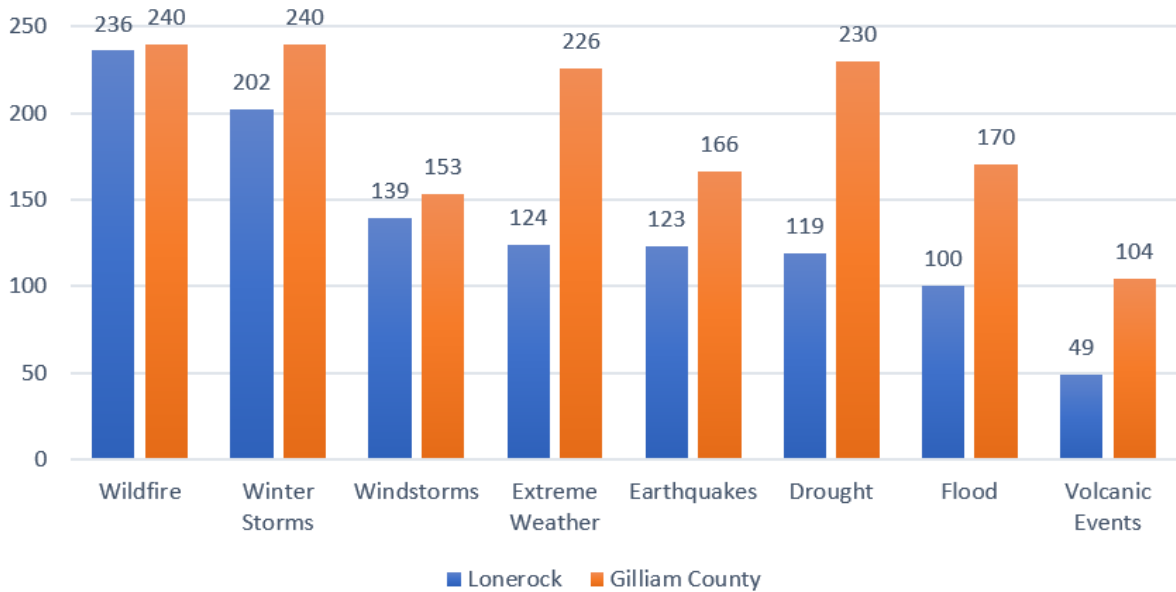
- Winter Storm/landslide
- Windstorm
- Extreme Weather
- Drought
- Flood

Summary

Figure LA-6 presents a summary of the hazard analysis for the City of Lonerock and compares the results to the assessment completed by Gilliam County.

The city rated their threat from every hazard as lower than the County, and their threat from drought and volcanic hazards as significantly lower than the County.

Figure LA-2 Overall Hazard Analysis Comparison–Gilliam County/Lonerock



Source: City of Lonerock NHMP Steering Committee and Gilliam County NHMP Steering Committee

Hazard Characteristics and Impacts

Please review the Risk Assessment (Volume I, Section 2) for additional information on each hazard.

Drought

The steering committee determined that the city's probability for drought is **low** (which is lower than the county's rating) and that their vulnerability to drought is **low** (which is lower than the county's rating).

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of drought hazards, as well as the location and extent of a potential event. Moderate droughts occur regularly in Gilliam County, primarily impacting the agricultural industry and increasing the risk of wildfire.

Lonerock' primary water supply comes from two wells and three springs, with a total storage capacity for 90,000 gallons. The City does not have a water treatment plan, but they test water quarterly. In general, water supply is available and sufficient. One significant drought in the 1970's affected water supply to the extent that water was rationed among residents

occasionally over a several year period. While droughts affect surrounding agricultural industry, impacts on City residents are rare and minimal.

Earthquake

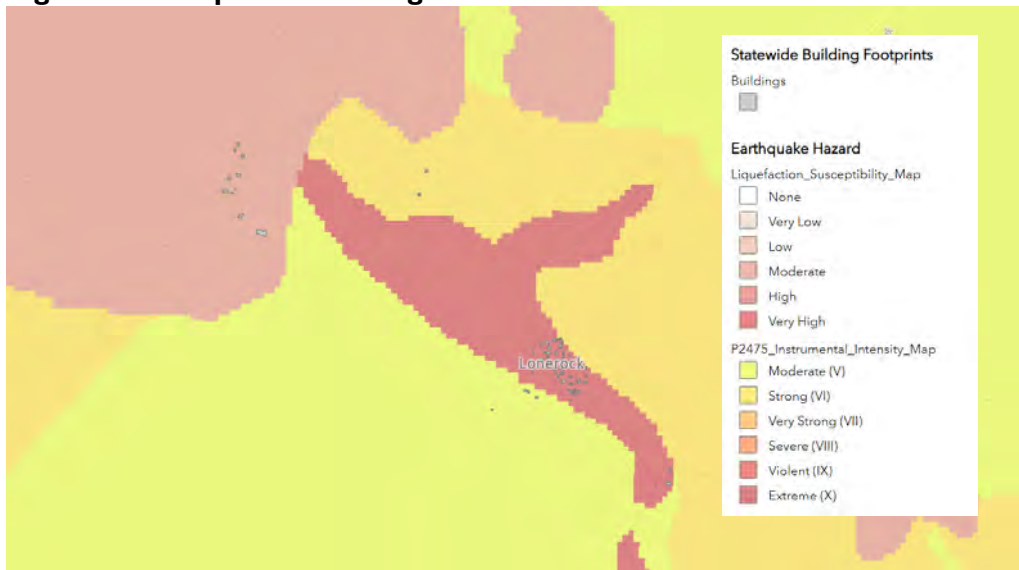
The Steering Committee determined that the City’s probability for an earthquake event is **low** (which is lower than the county’s rating) and that their vulnerability is **moderate** (which is the same as the county’s rating).

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of earthquake hazards, history, as well as the location and extent of a potential event. Generally, an event that affects the County is likely to affect Lonerock to a similar degree. The liquefaction potential in Lonerock is moderate, which is slightly higher than Gilliam County overall, and expected shaking from both a Cascadia Subduction Zone and a crustal event ranges from moderate to strong.

The causes and characteristics of an earthquake event are appropriately described within the County’s plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the County’s plan. The community impacts described by the County would occur in Lonerock to a similar extent. The majority of Lonerock houses (95.7%) were built before 1990 and 43.5% were built before 1960, and indicating moderate seismic vulnerability. However, Lonerock does not have critical emergency or government infrastructure.

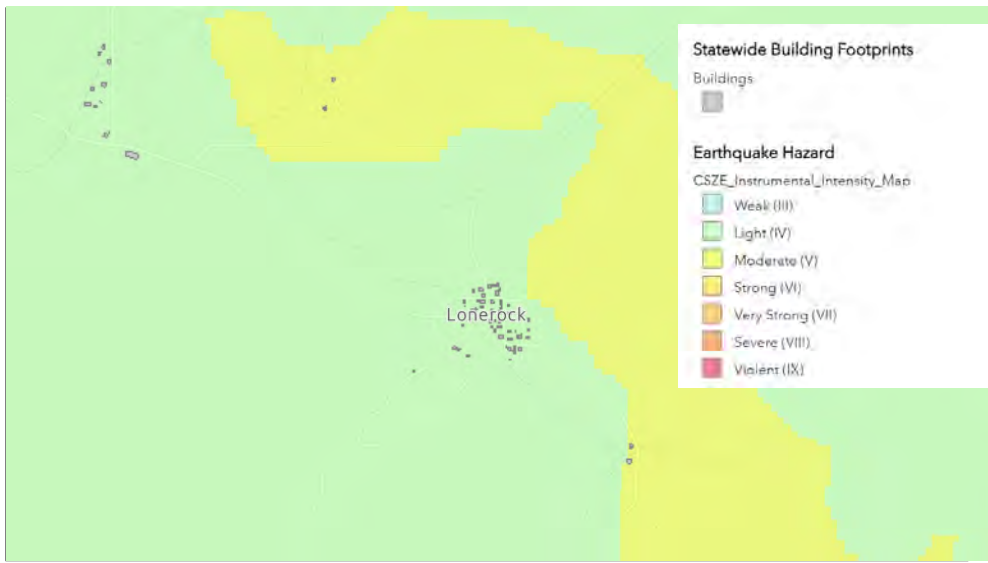
Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any particular site. Lonerock’s soft soil hazard locations can be seen in Figure LA-2. Expected shaking from Cascadia Subduction Zone earthquake can be seen in Figure LA-3.

Figure LA-2 Expected Shaking and Soft Soils



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI), accessed on 12/02/2023

Figure LA-3 Expected Shaking (CSZ Event)



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI), accessed on 12/02/2023

Information on specific public buildings' (schools and public safety) estimated seismic resistance, determined by DOGAMI in 2007, found no critical public safety, government, or school facilities in the City of Lonerock. Utility (electric power, water, wastewater, natural gas) and transportation systems (bridges, pipelines) outside of the City may experience some damage, impacting electricity. However, most residents are prepared for periods of isolation.

Flood

The Steering Committee determined that the City's probability for flood is **high** (which is the same as the County's rating) and that their vulnerability to flood is **low** (which is lower than the County's rating).

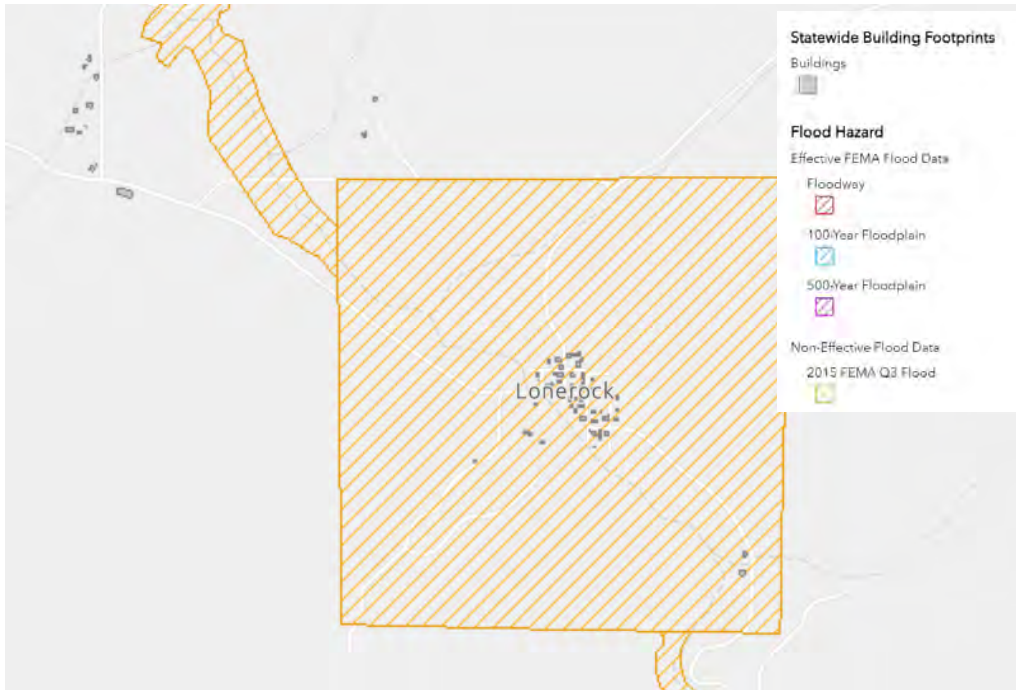
Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of flooding hazards within the region, as well as previous flooding occurrences. General flood-related community impacts are adequately described within the Flood Hazard Annex of Gilliam County's Natural Hazards Mitigation Plan. Lonerock has one creek, Lonerock Creek, passing through the City. The Creek level rises every two-three years, and occasionally washes over the road. It does not rise to the extent it halts traffic, damages the bridge, or damages residents. Flooding can isolate the community when Highway 206 or other bridges in the County get washed out. One significant flood event, in 1996, flooded several houses. They have since been elevated. Lonerock has negligible flood hazard risk as seen in Figure LA-4.

National Flood Insurance Program (NFIP)

Flood Insurance Rate Maps in Gilliam County, the City of Arlington and the City of Condon are current as of September 24, 1984. The City of Lonerock has not been mapped for floodplain purposes, nor does it participate in the National Flood Insurance Program (NFIP). The city is currently considering if they would like to be mapped as part of the 2024 FEMA floodplain update.⁸

⁸ Christina Fitzsimmons, Gilliam County Emergency Manager, Personal Communication October 2023.

Figure LA-4 Special Flood Hazard Area



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI) accessed on 12/02/2023

Volcanic Event

The Steering Committee determined that the City's probability for volcanic event is **low** (which is the same as the county's rating) and that their vulnerability to volcanic event is **low** (which is lower than the county's rating).

Volume I, Section 2, *Risk Assessment*, adequately describes Lonerock' risk to volcanic events. Generally, an event that affects the county is likely to affect Lonerock as well. The causes and characteristics of a volcanic event are appropriately described within the county's plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the county's plan, and the community impacts described by the county would generally be the same for Lonerock as well. Lonerock is very unlikely to experience anything more than volcanic ash during a volcanic event. When Mt. Saint Helens erupted in 1980, Lonerock received some light ashfall, but no significant impact.

Wildfire

The steering committee determined that the City's probability for wildfire is **high** (which is the same as the County's rating) and that their vulnerability to wildfire is **high** (which is the same as the County's rating).

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of wildfires, as well as the county and city's history of wildfire events. Fires occur annually in close proximity to Lonerock, and have limited impact on the community. Residents experience lowered air quality from smoke. No significant fires have impacted the City.

The location and extent of wildfires vary depending on fuel, topography, and weather conditions; however Lonerock is a high risk area. The City is surrounded by steeply sloped canyons and dry grasses, and experiences constant low winds and hot summers. Residents actively eliminate tall grasses and weeds and maintain defensible space around property. The most common ignition cause for wildfires is lightning.

The potential community impacts and vulnerabilities described in the County's NHMP are generally accurate for the City as well. Gilliam County developed a Community Wildfire Protection Plan (CWPP) in 2022, which describes how summer weather, terrain, crops and natural vegetation of Gilliam County lends itself to the ongoing problem of wildfires throughout the County. The City of Lonerock maintains an active volunteer firefighting team, and recently installed four fire hydrants. The hydrants, with accompanying hoses, can reach all properties within the City.

The Gilliam County CWPP provides some risk and vulnerability information related to Lonerock that has been incorporated into this plan as applicable.⁹

Windstorm

The Steering Committee determined that the City's probability for windstorm is **moderate** (which is lower than the County's rating) and that their vulnerability to windstorm is **low** (which is lower than the County's rating).

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of windstorms, as well as the location and extent of windstorm hazards. The region's (and city's) history of events is adequately described within the County's plan as well. Because windstorms typically occur during winter months, they are sometimes accompanied by ice, freezing rain, flooding, and snow. For the purposes of this plan, windstorms are considered an individual hazard, distinct from winter storms. Alone, they have much lower potential to affect the City. Lonerock experiences a constant breeze. Winds rarely reach 40-50 miles per hour. Occasionally, winds blow over trees or break limbs. The utility infrastructure is well mitigated, and residents are prepared for brief power outages. Gilliam County's plan adequately describes the impacts caused by windstorms, including power outages, downed trees, and storm-related debris. Utility disruptions are secondary results.

Winter Storm

The Steering Committee determined that the City's probability for winter storm is **high** (which is the same as the county's rating) and that their vulnerability to winter storm is **moderate** (which is lower than the County's rating).

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of winter storms, as well as the location and extent of winter storm hazards. In general, Lonerock experiences winter storms to a similar extent as the County. The region's (and city's) history of events is adequately described within the county's plan. Severe winter storms can consist of rain, freezing rain, freezing fog, ice, snow, extreme cold, sleet, and wind. These storms are most

⁹ Gilliam County Wildfire Protection Plan, 2022.

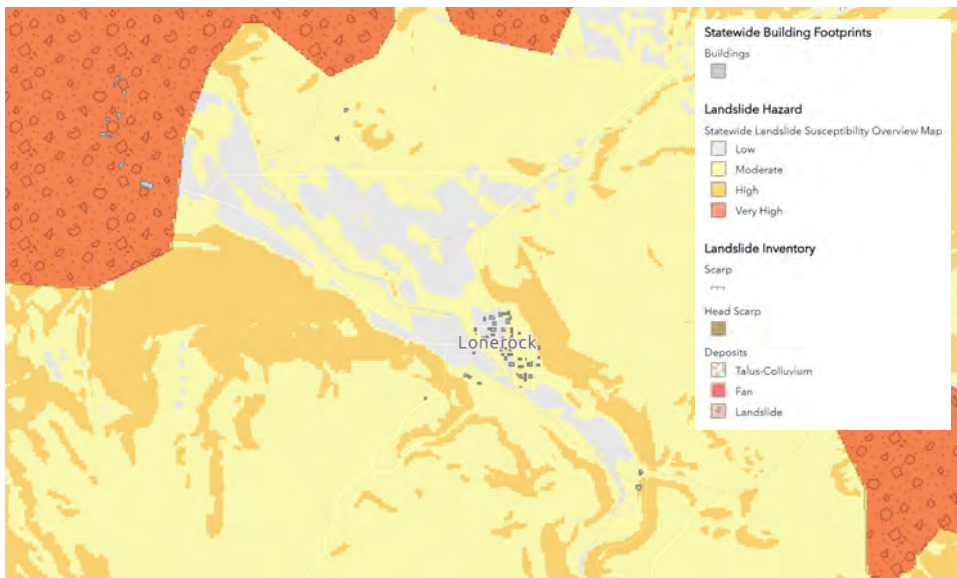
common from November/December through March/April, though their duration is highly variable. Winter storms are an annual occurrence.

Major winter storms can and have occurred in the Lonerock area, and while they typically do not cause significant damage, they are frequent. The most common impact is that roads become impassable due to snow drifts. Power outages for several hours are common; brown outs (power intermittently on and off) are common when utility lines are shaken to remove ice. The City has gravity flow water, landline telephones, and adequate food storage in case of isolation.

Landslides

Like Gilliam County, Lonerock does not experience significant landslides or consider them a substantial hazard. Landslide susceptibility exposure for Lonerock is shown in Figure LA-5. Approximately 15% of Lonerock has low landslide susceptibility, 69% has moderate, and 16% has high landslide susceptibility.¹⁰ The highest risk areas are on the eastern and western borders of the City. Potential landslide-related impacts are described within the county's NHMP and include economic impacts (due to isolation and/or arterial road closures) and obstruction to evacuation routes.

Figure LA-5 Landslide Susceptibility Exposure



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI) accessed on 12/02/2023

¹⁰ DOGAMI Open-File Report, O-16-02, Landslide Susceptibility Overview Map of Oregon

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Volume III: Mitigation Resources

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APPENDIX A: ACTION ITEM FORMS

Introduction

There are 35 mitigation actions listed for Gilliam County, and all of them are detailed in this appendix of action item forms. Several of the mitigation actions are also applicable to the Cities of Arlington, Condon, and Lonerock. There are 35 total mitigation actions for the three Cities. The mitigation actions for the County are also listed in Table 3.1.

Multi-Hazard

There are 12 multi-hazard mitigation actions. The natural hazards of volcano and windstorm do not have hazard-specific mitigation actions but they are included in these multi-hazard actions.

- 1) Provide public information regarding natural hazards via website posting, social media, newsletter, mailings, and distributed flyers.
Status: Ongoing from the 2018 NHMP Update. The Gilliam County Emergency Manager performs this task quarterly.
- 2) Seek funding for the implementation of priority projects that reduce the vulnerability of critical public facilities in Gilliam County.
Status: Ongoing and Modified from 2018 NHMP. Projects were completed between 2018-2024 and more are planned.
- 3) Maintain the comprehensive impact database on severe natural hazard events in Gilliam County.
Status: Completed and ongoing from 2018 NHMP.
- 4) Seek funding for backup generators for critical facilities including Arlington Clinic, North Gilliam County Emergency Medical Services (NGEMS), Arlington Middle School, Arlington High School, Arlington City Hall, Arlington Water Pumping Station, Gilliam County Fair Grounds and Lonerock Community Center.
Status: Deferred, and Modified from 2018 NHMP. Specific critical facilities were listed.
- 5) Work with OEM to establish a 2 Weeks Ready Program in Gilliam County.
Status: Developed during the 2024 NHMP update.

Multi-Hazard

- 6) Increase the number of people signed up for Frontier 911 Alerts.
Status: Developed during the 2024 NHMP update.

- 7) Work with critical businesses for backup power and Internet, including gas stations and grocery stores.
Status: Developed during the 2024 NHMP update.

- 8) Install a HAM radio Repeater at the Condon Radar Base/Richmond Road Community. **Status:**
Developed during the 2024 NHMP update.

- 9) Obtain radios for public works to better communicate with the Road Department, Fire Protection Districts and ODOT during hazardous situations.
Status: Developed during the 2024 NHMP update.

- 10) Establish the Gilliam County Fair Grounds in Condon as a multi-purpose Community Resilience Center to Provide shelter and resources during fire, climate, and other emergencies. Install backup generators to power buildings with emergency shelter capabilities, air filtration systems and air conditioning systems.
Status: Developed during the 2024 NHMP update and included in the Gilliam County Community Wildfire Protection Plan.

- 11) Establish a multipurpose Community Resilience Center in Arlington to provide shelter and resources during fire, climate, and other emergencies. Install back-up generators to power buildings with emergency shelter capabilities, air filtration systems and air conditioning systems.
Status: Developed during the 2024 NHMP update and included in the Gilliam County Community Wildfire Protection Plan.

- 12) City of Lonerock: Install a generator at Lonerock Community center for a resilience center to provide shelter and resources during climate and other emergencies.
Status: Developed during the 2024 NHMP update.

Multi-Hazard #1

Proposed Action Item: MH#		Alignment with Plan Goals:	
Provide public information regarding natural hazards via website posting, social media, newsletters, mailings, and distributed flyers.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> Understanding a hazards risk empowers the public to use their resources more effectively to prepare for it. With limited agency resources available, it is necessary for the residents and the public to be able to respond. A community's response capabilities can have a significant impact on the damage a hazard has on a community. The three incorporated cities in Gilliam County – Arlington, Condon, and Lonerock - have limited resources and rely on the County for certain services and public facilities. Because the Cities rely so heavily upon the County to provide services, this action is a multi-jurisdictional action because it benefits both the County and all the participating cities. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Educate the public on what to do in a flood including such information as not driving through flooded roads. Educate the public on water conservation, erosion control, and drought resistance plants. Educate the public on what to do in a wildfire, defensible space around homes, home hardening. Educate the public regarding staying indoors during extreme hazard events. Have information regarding volcanoes readily available to residents of the County and general public. Educate the public on what to do prior to and during severe weather, windstorm, and winter storm events. Educate the public regarding earthquakes, and make sure citizens know which buildings are deemed shelters. Implement Natural Hazard outreach days at schools, invite parents to presentations. Implement Natural Hazard outreach days at Senior Meal Sites and Retirement Village. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
Cities of Arlington, Condon, and Lonerock, NGCRFPD, SGCRFPD, Gilliam County Fire Services		DOGAMI, ODEM, FEMA, OSFM, OSU EX, FSA, NRCS	
Potential Funding Sources:		Timeline:	
County General Funds, City General Funds, ODEM and OSFM for hazard specific outreach		Ongoing (The Gilliam County Emergency Manager performs this task quarterly).	
Form Submitted by:	Gilliam County		
Action Item Status:	Ongoing and Modified from 2018 NHMP, retained for 2024		

Multi-Hazard #2

Proposed Action Item: MH#		Alignment with Plan Goals:	
Seek funding for the implementation of priority projects that reduce the vulnerability of critical public facilities in Gilliam county.		Goal 1: Safety of life and the preservation of property and industry Goal 2: Increased cooperation and collaboration between groups and agencies.	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> Gilliam County is vulnerable to several natural hazards that can affect public facilities. Several of the facilities identified in Chapter 2: Risk assessment require different actions to increase their resilience to natural hazards. The three incorporated cities in Gilliam County – Arlington, Condon, and Lonerock - have limited resources and rely on the County for certain services and public facilities. Because the Cities rely so heavily upon the County to provide services, this action is a multi-jurisdictional action because it benefits both the County and all the participating Cities. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> The Cities should coordinate with the County to identify critical facilities in their communities and seek funding for mitigation projects that will reduce risk in each community. Utilize outcomes of DOGAMI’s efforts on Senate Bill 2 seismic hazard inventory and risk assessment: http://www.oregongeology.org/rvs/default.htm Identify specific vulnerabilities to public facilities for each natural hazard, especially those constructed of un-reinforced masonry that is vulnerable to earthquakes. Prioritize facilities based on vulnerability and critical services in emergency situations. Identify actions communities can take to reduce a facility’s vulnerability to a natural hazard. Upgrade structures at the County fairgrounds and secure generator hookups for fairgrounds. Upgrade infrastructure for water systems in county. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Internal Partners:		External Partners:	
Cities of Arlington, Condon, and Lonerock; Gilliam County departments, Gilliam County NHMP Steering Committee		DOGAMI; Oregon Department of Emergency Management, Federal Emergency Management Agency, Oregon State Fire Marshal	
Potential Funding Sources:		Timeline:	
Seismic Rehabilitation Grant Program, Homeland Security Grants, HMPG, City and County General Funds		Long Term (3-5 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Ongoing and Modified from 2018 NHMP. Projects were completed between 2018-2024 and more are planned.		

Multi-Hazard #3

Proposed Action Item: MH#		Alignment with Plan Goals:	
Maintain a comprehensive impact database on severe natural hazards in Gilliam County.		Goal 1: Safety of life and the preservation of property and industry Goal 2: Increased cooperation and collaboration between groups and agencies.	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Each natural hazard can pose significant risks to the public, especially in certain high-risk areas in the County. Compiling an impact database will allow Gilliam County to better prepare itself and the public to use precaution in potentially hazardous areas. • The Disaster Mitigation Act of 2000 requires the documentation of previous hazard occurrences [201.6(c)(2)(i)]. Maintaining this database allows the communities to quickly update the hazard history portion of the mitigation plan required during the five-year update process. • Because the Cities rely so heavily upon the County to provide services, this action is a multi-jurisdictional action because it benefits both the County and all the participating Cities. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Document future events including impacts and losses. • Identify public infrastructure and facilities subject to closures due to snowfall and ice hazards during winter storms; and • Continue to strengthen partnerships between utility providers and county and city public works agencies to document known hazard areas and minimize risks. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		No	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
Cities of Arlington, Condon, and Lonerock; Gilliam County Planning; Public Works		Public Utilities; Oregon Watermaster District 21; OSU Extension Service; Farm Service Agency; National Weather Service; Natural Resources Conservation Service	
Potential Funding Sources:		Timeline:	
Gilliam County General Funds, City General Funds		Ongoing	
Form Submitted by:		Gilliam County Emergency Management	
Action Item Status:		Ongoing, Modified from 2018 NHMP.	

Multi-Hazard #4

Proposed Action Item: MH#		Alignment with Plan Goals:	
Seek funding for backup generators for critical facilities including Arlington Clinic, Condon Clinic, North Gilliam County Emergency Medical Services (NGEMS), Arlington Middle School, Arlington High School, Arlington City Hall, Arlington Water Pumping Station, Gilliam County Fair Grounds and Lonerock Community Center.		Goal 1: Safety of life and the preservation of property and industry	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • The Steering Committee identified the need for generators throughout the county at the above critical facilities. • A frequent impact from natural hazards, including winter storms, windstorms, and wildfires, is power outages resulting from damaged power lines. It is also likely that the community may lose access to fuel resources in the event of a major hazard elsewhere in the state. • Additionally, with the increase of extreme weather due to climate change, back up generators at critical facilities will allow for multiple warming and cooling centers, increasing the county's climate resiliency for vulnerable populations. • Because the Cities rely so heavily upon the County to provide services, this action is a multi-jurisdictional action because it benefits both the County and all the participating Cities, and most cities will need County assistance applying for funding. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Seek funding source for emergency back-up generators (NOTE: FEMA mitigation programs will NOT fund generators). • Work closely with State Partners such as ODEM and ODHS to fund evacuation location generators. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
Cities of Arlington, Condon, and Lonerock North Gilliam EMS, Public Works		Public Utilities, Oregon Department of Emergency Management, Oregon Department of Human Services	
Potential Funding Sources:		Timeline:	
Homeland Security Grants		Long term (3-5 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Completed, Deferred and Modified from 2018 NHMP, retained for 2024		

Multi-Hazard #5

Proposed Action Item: MH#5		Alignment with Plan Goals:	
Work with ODEM to establish a 2 Weeks Ready program in Gilliam county.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p>	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> Gilliam County is an incredibly rural community with a large number of its citizens not living in incorporated cities. Additionally, Fire and EMS agencies are all volunteers, making response times slow and extremely limited by the number of personnel no matter what size of the disaster. The Be 2 Weeks Ready program recommends people have an emergency plan and enough food, water and supplies to survive on their own for at least two weeks following any large-scale disaster. Be 2 Weeks Ready is sponsored by ODEM who has resources on developing emergency plans, and building emergency kits, including what an individual needs for food, first aid, shelter, water, pets, and livestock. Citizens who are 2 Weeks ready will take pressure off limited numbers of first responders so they can prioritize life-threatening situations first. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Combine disseminating information on 2 Weeks Ready with other forms of public outreach for natural hazards established in MH #1. Receive pre-made 2 Weeks Ready Pamphlets from ODEM, have available at major public locations, including the Gilliam County Court House, Arlington City Hall, Condon City Hall, and major businesses. Provide an informational booth at the Gilliam County Fair on 2 Weeks Ready. Conduct an emergency preparedness outreach program at the schools in Arlington and Condon, invite parents to attend the assembly. Because the Cities rely so heavily upon the County to provide services, this action is a multi-jurisdictional action because it benefits both the County and all the participating Cities. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Should focus on the large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Emergency Manager	
Internal Partners:		External Partners:	
Cities of Arlington, Condon and Lonerock. North and South Gilliam County Rural Fire Protection Districts, Gilliam County Fire Services, Gilliam County Family Services		Oregon Department of Emergency Management, Oregon State Fire Marshal, OSU Extension Service	
Potential Funding Sources:		Timeline:	
Oregon Department of Emergency Management, Gilliam County Emergency Management Budget		Short Term (1-2 years)	
Form Submitted by:		Gilliam County	
Action Item Status:		Developed during the 2024 NHMP update.	

Multi-Hazard #6

Proposed Action Item: MH#6		Alignment with Plan Goals:	
Increase the number of people signed up for Frontier 911 Alerts.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • The Frontier 911 Emergency Alert Program allows citizens to be informed about emergencies and other important community news: including time sensitive information on severe weather, unexpected road closures, missing persons and evacuations of buildings or neighborhoods. • Increasing the number of Gilliam County Citizen signed up for this program will assist with public outreach and safety. Knowing about emergencies and severe weather as soon as they happen or shortly before allows citizens to prepare themselves and be more informed. It can also reduce the load on emergency responders, as citizens will not be calling public agencies to find out what is happening if they have already received notification. • Because the Cities rely so heavily upon the County to provide services, this action is a multi-jurisdictional action because it benefits both the County and all the participating Cities. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Include outreach on the Frontier 911 Emergency Alert Program with other disaster information outreach, including natural hazards and 2 Weeks Ready Program. • Provide signup information to local first responders in EMS, Fire and Law enforcement to hand out to the public during their interactions. • Place posters and informational brochures at major public locations, including the Gilliam County Court House, Arlington City Hall, Condon City Hall, and major businesses. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		No	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
Cities of Arlington, Condon and Lonerock. North and South Gilliam County Rural Fire Protection Districts, Gilliam County Fire Services, Gilliam County Sheriff's Office		Frontier 911, Everbridge Alerts	
Potential Funding Sources:		Timeline:	
Gilliam County Sheriff's Office, Frontier 911		Short Term (1-2 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed during the 2024 NHMP update.		

Multi-Hazard #7

Proposed Action Item: MH#7		Alignment with Plan Goals:
Work with critical businesses for backup power and internet, including gas stations and grocery stores.		Goal 1: Safety of life and the preservation of property and industry
Rationale for Proposed Action Item:		
<ul style="list-style-type: none"> • Most gas stations and grocery stores in Arlington and Condon have an internet-based point of sale system. • When the City of Condon has experienced loss of power or internet, citizens were unable to purchase fuel because the pumps were based on internet services. • Due to the isolated nature of Gilliam County Cities, gas stations and grocery stations not operating during extended loss of internet or power is a huge risk to public safety and can leave citizens and tourists trapped. • Because the Cities rely so heavily upon the County to provide services, this action is a multi-jurisdictional action because it benefits both the County and all the participating Cities. 		
Ideas for Implementation:		
<ul style="list-style-type: none"> • Provide local businesses with information on programs to assist with funding for generators. • Work with ODEM to determine if there is a funding source for critical businesses to ensure they can perform services in the event of a loss of power or internet. 		
Does the action alleviate long-term risk from future conditions including climate change?	Yes	
Benefit to Underserved/Socially Vulnerable Population	Serves the non-mobile community specifically.	
Coordinating Organization	Gilliam County Emergency Management	
Internal Partners:	External Partners:	
Cities of Arlington, Condon and Lonerock. Critical businesses including gas stations and grocery stores in Arlington and Condon.	Oregon Department of Emergency Management, Federal Emergency Management Agency, Public Utilities, EnergyTrust of Oregon, Business Oregon	
Potential Funding Sources:	Timeline:	
FEMA, Public Utilities, Business Oregon, EnergyTrust of Oregon	Long-Term (3-5 years)	
Form Submitted by:	Gilliam County	
Action Item Status:	Developed during the 2024 NHMP update.	

Multi-Hazard #8

Proposed Action Item: MH#		Alignment with Plan Goals:	
Install a HAM Radio Repeater at the Condon Radar Base/Richmond Road Community		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • The Community on Richmond Road has been threatened by several natural hazards in the past, including fire. Due to their location being 10 miles from the City of Condon, they are isolated from most City Services. • If the community loses power, they have no way to communicate with other agencies. • Installation of a HAM radio repeater would allow the isolated community to communicate and request assistance in the event of a large-scale disaster when other methods of communication are not working. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • The antenna has already been purchased and the organizer just needs assistance with the installation. • Provide assistance from County Department (Road Department, Weed Department, etc.) to assist with installation of tower. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves an isolated community.	
Coordinating Organization		Richmond Road Community	
Internal Partners:		External Partners:	
City of Condon, Gilliam County		OSU Extension Service	
Potential Funding Sources:		Timeline:	
N/A		Ongoing	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed during the 2024 NHMP update.		

Multi-Hazard #9

Proposed Action Item: MH#9		Alignment with Plan Goals:	
Obtain radios for public works to better communicate with the Road Department, Fire Protection Districts and ODOT during hazardous situations.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> Public Works in Condon and Arlington support responding agencies during emergency response in a variety of hazard scenarios, especially during wildfires and winter storms. Public Works assists the Road Department and ODOT with Road Closures and provides additional situational awareness, but they do not have a reliable way to communicate with organizations they are assisting. By purchasing them radios, they can assist ODOT, the Road Department, Sheriff's Office and Fire Districts with road closures, evacuations, and other hazard situations. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Apply for funding through government grants to purchase radios. Work with ODOT to ensure Public Works has required channels. Work with NGCFPD and SGCRFPD to ensure Public Works has required channels. 			
Does the action alleviate long-term risk from future conditions including climate change?		No	
Benefit to Underserved/Socially Vulnerable Population		No	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
Cities of Arlington and Condon, Public Works, Gilliam County Road Department		Oregon Department of Transportation, Oregon State Fire Marshal	
Potential Funding Sources:		Timeline:	
Communications Grants, Gilliam County Budget, City of Arlington, and Condon General Funds		Short Term (1-2 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed during the 2024 NHMP update.		

Multi-Hazard #10

Proposed Action Item: MH#		Alignment with Plan Goals:	
Establish the Gilliam County Fair Grounds in Condon as a multi-purpose Community Resilience Center to Provide shelter and resources during fire, climate, and other emergencies. Install backup generators to power buildings with emergency shelter capabilities, air filtration systems and air conditioning systems.		Goal 1: Safety of life and the preservation of property and industry Goal 2: Increased cooperation and collaboration between groups and agencies.	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> The Gilliam County Fair Grounds is a large building complex with several buildings available for emergency use much of the year. The Fair Grounds are large enough to accommodate citizens evacuating from multiple locations in the County, particularly the City of Lonerock. It is already used as a staging area for large-scale fire response, and improving its capabilities will assist with making the community safer. Retrofits will not result in any loss of services. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Ensure plans for the new Gilliam County Events Center at the Fair Grounds have hazard mitigation in mind, including installed infrastructure for a backup generator, air filtration, air conditioning and internet services. Coordinate closely between the Gilliam County Fair Board, Emergency Management, City of Condon, Public Health, and Emergency Response agencies to determine needs for a Community Resilience Center. Apply for funding through ODEM, FEMA and ODHS for purchase and installation of necessary safety equipment. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
Gilliam County Fair Board, City of Condon, Gilliam County Public Health		Oregon Department of Emergency Management, Federal Emergency Management Agency, Oregon Department of Human Services, Oregon State Fire Marshal	
Potential Funding Sources:		Timeline:	
Homeland Security Grants Building Resilient Infrastructure and Communities Grant Business Oregon Grants		Long Term (3-5 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed during the 2024 NHMP update and included in the GC Community Wildfire Protection Plan.		

Multi-Hazard #11

Proposed Action Item: MH#		Alignment with Plan Goals:	
Establish a multipurpose Community Resilience Center in Arlington to provide shelter and resources during fire, climate, and other emergencies. Install back-up generators to power buildings with emergency shelter capabilities, air filtration systems and air conditioning systems.		Goal 1: Safety of life and the preservation of property and industry Goal 2: Increased cooperation and collaboration between groups and agencies.	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> The City of Arlington has a large vulnerable population, including the elderly, the young, single parent households and those in poverty. A community resilience center is necessary to provide shelter during fires, smoke, climate, and other emergencies. A local one that residents can walk to and would be able to bring children to or disabled persons can easily access is essential for community safety. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Identify a location for a resilience center. Coordinate closely between the Gilliam County Emergency Management, Public Health, City of Arlington, and Emergency Response agencies. Apply for funding through ODEM, FEMA and ODHS for purchase and installation of necessary safety equipment. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
City of Arlington, North Gilliam County Rural Fire Protection District, North Gilliam County Emergency Medical Services, Gilliam County Public Health		Federal Emergency Management Agency, Oregon Department of Emergency Management, Oregon Department of Human Services, Oregon State Fire Marshal	
Potential Funding Sources:		Timeline:	
Homeland Security Grants Building Resilient Infrastructure and Communities Grant Public Health Grants		Long Term (3-5 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed during the 2024 NHMP update and included in the GC Community Wildfire Protection Plan.		

Multi-Hazard #12

Proposed Action Item: MH#12		Alignment with Plan Goals:	
City of Lonerock: Install a generator at Lonerock Community center for a resilience center to provide shelter and resources during climate and other emergencies.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> The City of Lonerock is comprised of elderly residents and is located 30 minutes from the City of Condon. A community resilience center is necessary to provide shelter during smoke, climate, and other emergencies. A local resilience center that residents can walk to and would be able to bring children or disabled persons can easily access to is essential for community safety. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Designated the Community Center as Lonerock's official resilience center. Coordinate closely between the Gilliam County Emergency Management, Public Health, City of Lonerock and Emergency Response agencies. Apply for funding through ODEM, FEMA and ODHS for purchase and installation of necessary safety equipment. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
City of Lonerock, South Gilliam County Rural Fire Protection District, South Gilliam County Emergency Medical Services, Gilliam County Public Health		Federal Emergency Management Agency, Oregon Department of Emergency Management, Oregon Department of Human Services, Oregon State Fire Marshal	
Potential Funding Sources:		Timeline:	
Homeland Security Grants Building Resilient Infrastructure and Communities Grant Public Health Grants		Long Term (3-5 years)	
Form Submitted by:		Gilliam County	
Action Item Status:		Developed during the 2024 NHMP update and included in the GC Community Wildfire Protection Plan.	

Drought

In the 2018 NHMP there was one drought mitigation action; now there are four for the 2024 NHMP.

- 1) Improve long range water sources; Increase storage through deeper wells
Status: Deferred from the 2018 NHMP update, retained for 2024 NHMP Update.

- 2) Conduct public outreach on water use and water saving techniques during periods of drought.
Status: Developed during 2024 NHMP Update

- 3) City of Condon: Conduct a groundwater assessment in Condon.
Status: Developed during 2024 NHMP Update

- 4) City of Condon: Update the City of Condon's water supply, including installing a new water transmission line from City Farm (well location) to the City of Condon and a new telemetry system.
Status: Developed during 2024 NHMP Update

Drought #1

Proposed Action Item: DR#	Alignment with Plan Goals:
Improve long range water sources; increase storage through deeper wells.	Goal 1: Safety of life and the preservation of property and industry
Rationale for Proposed Action Item:	
<ul style="list-style-type: none"> • Drought situations cause critical water shortages for humans, animals, and vegetation. • Some areas of Gilliam County have experienced dry wells or decreasing aquifers. • Gilliam County frequently experiences drought, therefore improving long range water sources is essential for public safety. 	
Ideas for Implementation:	
<ul style="list-style-type: none"> • Identify appropriate sites for wells. • Create RFP for project construction. • Seek funding from City, County, State or Federal Water Programs. 	
Does the action alleviate long-term risk from future conditions including climate change?	Yes
Benefit to Underserved/Socially Vulnerable Population	Serves the entire community, including large elderly population, youth population and low income.
Coordinating Organization	City of Condon
Internal Partners:	External Partners:
Gilliam County Emergency Management, Gilliam County Planning	Oregon Watermaster District 21; SWCD; Gilliam County Public Health
Potential Funding Sources:	Timeline:
Water Infrastructure Finance and Innovation Program Water Project Grants and Loans	Long Term (3-5 years)
Form Submitted by:	Gilliam County Emergency Management
Action Item Status:	Deferred from 2018 NHMP, retained for 2024

Drought #2

Proposed Action Item: DR#2		Alignment with Plan Goals:	
Conduct public outreach on water use and water saving techniques during periods of drought, including businesses and private individuals.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Drought situations cause critical water shortages for humans, animals, and vegetation. • Gilliam County frequently experiences drought. • Some areas of Gilliam County have experienced dry wells or decreasing aquifers. • Climate change models are projecting longer periods of dry weather interspersed with more intense rains, Therefore a well-educated public knowledgeable in water conservation techniques is a necessary climate adaptation. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Combine disseminating information on water use and water savings techniques with other forms of public outreach for natural hazards established in MH #1. • Provide an informational booth at the Gilliam County Fair on water savings activities. • Conduct a water use and savings outreach program at the schools in Arlington and Condon, invite parents to attend the assembly. • Have water savings tips available at major public locations, including the Gilliam County Court House, Arlington City Hall, Condon City Hall, and major businesses. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
Cities of Arlington, Condon and Lonerock Gilliam County Public Health, Soil and Water Conservation District		Federal Emergency Management Agency, Oregon Department of Emergency Management, Natural Resources Conservation Service, United States Department of Agriculture, OSU Extension Service	
Potential Funding Sources:		Timeline:	
Gilliam County Budget, obtain materials from FEMA, ODEM, NRCS, USDA and OSU		Ongoing	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed during the 2024 NHMP update		

Drought #3

Proposed Action Item: DR#		Alignment with Plan Goals:	
Conduct a groundwater assessment for Condon.		Goal 1: Safety of life and the preservation of property and industry Goal 2: Increased cooperation and collaboration between groups and agencies.	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Drought situations cause critical water shortages for humans, animals, and vegetation. • Some areas of Gilliam County have experienced dry wells or decreasing aquifers. • Condon is located a long way from water sources such as rivers and is fully dependent on groundwater for their municipal water supply. Knowing the status of their groundwater can assist with long term city planning and climate adaptation. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Coordinate with the SWCD to conduct a groundwater assessment. • Coordinate with the Oregon Department of Environmental Quality for a groundwater assessment. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		City of Condon	
Internal Partners:		External Partners:	
Gilliam County Emergency Management, Soil and Water Conservation District		Natural Resources Conservation Service, Oregon Department of Emergency Management, OSU Extension Service, Oregon Department of Environmental Quality	
Potential Funding Sources:		Timeline:	
Water Infrastructure Finance and Innovation Program, Water Project Grants and Loans Soil and Water Conservation District, Natural Resources Conservation Service		Long Term (3-5 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed during the 2024 NHMP update		

Drought #4

Proposed Action Item: DR#4		Alignment with Plan Goals:	
Update the City of Condon's water supply, including installing a new water transmission line from City Farm (well location) to the City of Condon and a new telemetry system.		Goal 1: Safety of life and the preservation of property and industry	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> The water infrastructure age for the City of Condon ranges from 1947 to 1999. New water transmission lines are needed to ensure water makes it safe and efficiently to the city from the location of its wells. A telemetry system in addition to a new water transmission line will increase efficiency. Drought situations cause critical water shortages for humans, animals, and vegetation. Some areas of Gilliam County have experienced dry wells or decreasing aquifers, and some climate change models are projecting longer periods of dry weather interspersed with more intense rains, so an efficient water system is a necessary climate adaptation. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Create RFP for project construction. Seek funding from City, County, State or Federal Water Programs. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		City of Condon	
Internal Partners:		External Partners:	
Gilliam County Emergency Management, Gilliam County Public Health, Soil and Water Conservation District		Oregon Watermaster District 21, Oregon Department of Environmental Quality	
Potential Funding Sources:		Timeline:	
Water Infrastructure Finance and Innovation Program, Water Project Grants and Loans Soil and Water Conservation District Oregon Department of Environmental Quality		Long Term (3-5 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed during the 2024 NHMP update		

Earthquake

In the 2018 NHMP there was one earthquake mitigation action; now there are three for the 2024 NHMP.

- 1)** Seek funding through the State Office of Emergency Management (OEM) and/or the Federal Emergency Management Agency (FEMA) to seismically retrofit critical facilities rated with either a very high or high collapse potential by the Department of Geology and Mineral Industries (DOGAMI).

Status: *Completed, Deferred and Modified from 2018 NHMP.*

- 2)** Increase public outreach for earthquake education.

Status: *Developed for the 2024 NHMP.*

- 3)** Seismically retrofit critical facilities not included in the DOGAMI 2006 assessment: Arlington Medical Clinic, South Gilliam Health Center, Arlington City Hall, Gilliam County Road Department Building, Arlington Childcare Center, and Condon Childcare Center.

Status: *Developed for the 2024 NHMP.*

Earthquake #1

Proposed Action Item: EQ#1		Alignment with Plan Goals:	
Seek funding through the Oregon Department of Emergency Management and/or the Federal Emergency Management Agency to seismically retrofit critical facilities with either a very high or high collapse potential rate by the Department of Geology and Mineral Industries.		Goal 1: Safety of life and the preservation of property and industry Goal 2: Increased cooperation and collaboration between groups and agencies.	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • DOGAMI completed the seismic needs assessment in August 2006 for Gilliam County. Three critical facilities were rated with Very High (100-percent) collapse potentials while two other critical facilities were rated with High (greater than 10-percent) collapse potentials. • The South Gilliam County Fire Hall and Condon Grade School were rebuilt, while other facilities are still in need of retrofits or replacements. • Arlington Middle School and Arlington High School are rated high and very high for risk of collapse. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Seek funding through various grant programs to seismically retrofit the critical facilities rated with high collapse potential ratings. • Prioritize courthouse retrofit. Complete schools after the Courthouse. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community specifically the youth population.	
Coordinating Organization		Gilliam County Planning Department	
Internal Partners:		External Partners:	
Cities of Arlington, Condon and Lonerock; School Districts (SD 3, SD25J); Gilliam County Emergency Management		Oregon Department of Emergency Management, Federal Emergency Management Agency, Oregon Department of Geology and Mineral Industries	
Potential Funding Sources:		Timeline:	
Seismic Rehabilitation Grant Program		Long Term (3-5 years)	
Form Submitted by:	Gilliam County Emergency Management		
Action Item Status:	Deferred and Modified from 2018 NHMP, retained for 2024		

Earthquake #2

Proposed Action Item: EQ#2		Alignment with Plan Goals:	
Increase public outreach for earthquake education		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p>	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Understanding of a hazard’s risks empowers the public to use their resources more effectively to prepare for it. With limited agency resources available, it is necessary for the residents and general public to be prepared to survive with minimal initial assistance. • A community’s response capabilities can have a significant impact on the damage a hazard has on a community. • A large-scale earthquake may not immediately impact Gilliam County due to ground shaking, but secondary effects through interruption of supply chain and resources being diverted to assist the rest of Oregon, Gilliam County residents need to be prepared to survive without outside input for a long period of time. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Combine disseminating information on earthquake hazards, including small scale earthquakes and a large-scale Cascadia Event with other forms of public outreach for natural hazards established in MH #1. • Provide an informational booth at the Gilliam County Fair on Earthquake potential. • Conduct an earthquake outreach program at the schools in Arlington and Condon, invite parents to attend the assembly. • Have Earthquake information and preparedness information available at major public locations, including the Gilliam County Court House, Arlington City Hall, Condon City Hall, and major businesses. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
City of Arlington, Condon and Lonerock, Arlington and Condon Schools, Gilliam County Planning		Oregon Department of Emergency Management, Federal Emergency Management Agency, Oregon Department of Geology and Mineral Industries	
Potential Funding Sources:		Timeline:	
Gilliam County Emergency Management		Ongoing	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed for the 2024 NHMP		

Earthquake #3

Proposed Action Item: EQ#		Alignment with Plan Goals:	
Seismically retrofit critical facilities not included in the DOGAMI 2006 assessment: Arlington Medical Clinic, South Gilliam Health Center, Arlington City Hall, Gilliam County Road Department Building, Arlington Childcare Center, and Condon Childcare Center.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> The Clinics, Childcare Centers, Road Department and City Halls are essential buildings for Gilliam County to continue to function effectively. Priority should be given to the DOGMAI assessed buildings, these additional pieces of critical infrastructure are older and should be seismically retrofitted when time and resources allow. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Conduct a seismic assessment for identified facilities to determine retrofitting needs. Seek funding through various grant programs to seismically retrofit the critical facilities with a high collapse potential. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community including the youth population and low income.	
Coordinating Organization		Gilliam County Planning Department	
Internal Partners:		External Partners:	
Cities of Arlington and Condon. Gilliam County Emergency Management, Arlington Medical Clinic, South Gilliam Health Center, Gilliam County Road Department, Arlington, and Condon Childcare Centers		Oregon Department of Emergency Management, Federal Emergency Management Agency, Oregon Department of Geology and Mineral Industries	
Potential Funding Sources:		Timeline:	
Seismic Rehabilitation Grant Program (OEM)		Long Term (3-5 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed for the 2024 NHMP.		

Flood

In the 2018 NHMP there was one flood mitigation action; there remains one for the 2024 NHMP.

- 1) Work with the State Floodplain Manager at the Department of Land Conservation and Development (DLCD) to obtain updated floodplain information for Gilliam County and its incorporated cities.

***Status:** Ongoing and deferred from 2018 NHMP. The Gilliam County Floodplain map is currently being updated.*

Flooding #1

Proposed Action Item: FL#1		Alignment with Plan Goals:	
Work with the State Floodplain Manager at the Department of Land Conservation and Development (DLCD) to obtain updated floodplain information for Gilliam County and its incorporated Cities.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> DLCD and DOGAMI are currently updating FEMA floodplain information for Gilliam County, including all three incorporated cities. Currently the County is operating with floodplain information from 1984. Updated floodplain maps would benefit the planning department and zoning regulations to be more accurate. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> DLCD and DOGAMI are currently mapping floodplains in Gilliam County. The County should continue to support this effort. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
Gilliam County Planning Department; Cities of Arlington, Condon and Lonerock		Oregon Department of Emergency Management, Federal Emergency Management Agency, Oregon Department of Geology and Mineral Industries, Department of Land Conservation and Development	
Potential Funding Sources:		Timeline:	
DLCD Project, FEMA project		Ongoing	
Form Submitted by:	Gilliam County		
Action Item Status:	Deferred and Modified from 2018 NHMP, retained for 2024		

Winter Storm

There were three city specific mitigation actions for winter storm in 2018. Now there are different mitigation actions for winter storm in 2024.

- 1) Work with ODOT on traffic patterns for rerouting major routes such as I-84 during winter storms, removing Highways 74 and 206 from I-84 alternate routes.

Status: Developed for the 2024 NHMP.

- 2) Conduct outreach throughout the County and incorporated cities about Winter Storm Dangers, including sidewalk maintenance during freezing rain events and protecting pipes during extreme cold periods.

Status: Completed, deferred and modified from the 2018 NHMP.

- 3) Upgrade aging snow removal equipment.

Status: Completed, deferred and modified from the 2018 NHMP.

Winter Storm #1

Proposed Action Item: WS#1		Alignment with Plan Goals:	
Work with ODOT on traffic patterns for rerouting major routes such as I-84 during winter storms, removing Highways 74 and 206 from I-84 alternate routes.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Highway 74 and Highway 206 are low priorities for snowplows and often the last to receive any sort of services. • When traffic is rerouted from I-84 through these routes it results in people becoming stuck in areas frequently without cell phone service. • Gilliam County Emergency Services and the Gilliam County Road Department, as well as ODOT have difficulty reaching anyone in distress on these routes, and often it would be quicker for travelers to wait for I-84 to reopen rather than take these alternate routes. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • The City of Condon coordinate with ODOT, informing them of the why using these highways as alternates is a bad idea. • Have ODOT remove 74 and 206 as authorized Highways to reroute traffic from I-84 during winter storms. 			
Does the action alleviate long-term risk from future conditions including climate change?		No	
Benefit to Underserved/Socially Vulnerable Population		No	
Coordinating Organization		City of Condon Public Works	
Internal Partners:		External Partners:	
Gilliam County Emergency Management, Cities of Arlington and Condon, Gilliam County Road Department		Oregon Department of Transportation	
Potential Funding Sources:		Timeline:	
Gilliam County		Short Term (1-2 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed for the 2024 NHMP.		

Winter Storm #2

Proposed Action Item: WS#2		Alignment with Plan Goals:	
Conduct outreach throughout the County and incorporated cities about Winter Storm Dangers, including sidewalk maintenance during freezing rain events and protecting pipes during extreme cold periods.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Understanding of a hazards risk empowers the public to use their resources more effectively to prepare for it. • There are many other hazards associated with winter storms other than snow or icy roads, and it is important to remind residents of slip and fall hazards and the potential for burst pipes during extreme cold events. • Several residents may not have experienced extreme cold in single family dwellings, and knowing how to prepare their owned or rented residence for extreme cold is essential. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Combine disseminating information on winter storm dangers with fall and winter outreach established in MH #1. • Provide an informational booth at the Gilliam County Fair on winter storm dangers. • Conduct an emergency preparedness outreach program at the schools in Arlington and Condon, invite parents to attend the assembly. • Post information on winter storm dangers on social media channels, and have information available at major public locations, including the Gilliam County Court House, Arlington City Hall, Condon City Hall, and major businesses. 			
Does the action alleviate long-term risk from future conditions including climate change?		No	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Individual Cities	
Internal Partners:		External Partners:	
Cities of Arlington, Condon and Lonerock. Gilliam County Emergency Management, Public Works, Gilliam County Road Department		Oregon Department of Emergency Management	
Potential Funding Sources:		Timeline:	
City General Funds, Emergency Management General Funds		Ongoing	
Form Submitted by:	Gilliam County		
Action Item Status:	Ongoing, and modified from 2018 NHMP.		

Winter Storm #3

Proposed Action Item: WS#3		Alignment with Plan Goals:	
Upgrade aging snow removal equipment.		Goal 1: Safety of life and the preservation of property and industry	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> The City of Condon recently upgraded one snowplow, and now needs to upgrade another older snowplow to continue to meet the needs of the City. Winter storm events are predicted to decrease in frequency, but increase in intensity with current climate models, and Gilliam County needs to be prepared. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Seek funding through County, State and Federal funding opportunities to purchase new snow removal equipment. 			
Does the action alleviate long-term risk from future conditions including climate change?		No	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		City of Condon	
Internal Partners:		External Partners:	
Gilliam County Road Department		Oregon Department of Transportation	
Potential Funding Sources:		Timeline:	
City Funds, Oregon Department of Transportation, Federal Excess Property Program		Long term (3-5 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Completed and Modified from 2018 NHMP.		

Wildfire

In the 2018 NHMP there were two wildfire mitigation actions; now there are eleven for the 2024 NHMP.

- 1) Provide Gilliam County Road Department with firefighting training and equipment
Status: Completed, Deferred and Modified from 2018 NHMP
- 2) Create firebreaks around vulnerable facilities through fire resistant plants, installed gravel/hardscaping or through vegetation management. Purchase equipment and supplies for establishing fuel breaks, including irrigation type water line, vegetation control devices and other equipment.
Status: Completed, deferred and modified from the 2018 NHMP. Included in the 2022 Community Wildfire Protection Plan (CWPP).
- 3) Work with Day Wireless to ensure weed/vegetation mitigation is performed around critical communication towers.
Status: Developed during the 2024 NHMP update.
- 4) Create a county-wide landowner outreach program to educate and incentivize defensible space best practices, including defensible space around homes, using fire resistant plants in landscaping and other established methods.
Status: Developed during the 2024 NHMP update. Included in the 2022 CWPP.
- 5) Develop a program for prescribed animal grazing in high-risk areas throughout the County, including exploring a cost share option with private landowners.
Status: Developed during the 2024 NHMP update. Included in the 2022 CWPP.
- 6) Develop a fire prevention sign program with important State, Federal and Local partners; including but not limited to Bureau of Land Management, Oregon Parks and Recreation Department, Sherman County, Wheeler County, Travel Oregon, Oregon State Fire Marshal, Oregon Department of Transportation, etc.
Status: Developed during the 2024 NHMP update. Included in the 2022 CWPP.
- 7) Complete a road, culvert, stream crossing and railroad crossing assessment to address existing situations which could result in problems for evacuation of residents and limit fire apparatus during a wildfire response.
Status: Developed during the 2024 NHMP update. Included in the 2022 CWPP.
- 8) Assist Rural Fire Protection Districts in upgrading their firefighting equipment to increase wildland firefighting capabilities and capacity.
Status: Developed during the 2024 NHMP update. Included in the 2022 CWPP.

Wildfire

- 9) Promote the use of wildfire and drought resistant plants around homes and businesses.

Status: *Developed during the 2024 NHMP Updated. Included in the 2022 CWPP.*

- 10) City of Arlington: Reduce wildfire fuel load through weed abatement projects and fuel/fire breaks in the City of Arlington.

Status: *Completed, Deferred and Modified from 2018 NHMP, retained for 2024 and included in the 2022 CWPP.*

- 11) City of Lonerock: Conduct weed abatement to reduce wildfire risk through maintenance of yard and roadside vegetation in the City of Lonerock.

Status: Completed, Deferred and Modified from 2018 NHMP, retained for 2024 and included in the Gilliam County Community Wildfire Protection Plan

Wildfire #1

Proposed Action Item: WF#1		Alignment with Plan Goals:	
Provide Gilliam County Road Department with firefighting training and equipment.		Goal 1: Safety of life and property Goal 2: Increased cooperation and collaboration between groups and agencies. Goal 3: Motivate the public, private sector, and government agencies to mitigate the effects of natural hazards through information and education.	
Rationale for Proposed Action Item			
<ul style="list-style-type: none"> • In a self-completed hazard analysis, Gilliam County reported itself as being highly vulnerable to wildfire as well as a high probability of future wildfire events. • Gilliam County has one full time fire chief, the other fire chief and all firefighters are volunteer only. • Providing training and equipment to the County Road Department will increase capacity and safety, as the Gilliam County Road Department frequently responds to fires with grading equipment. • A community's response capabilities can have a significant impact on the impact wildfire has on a community. Because the Cities rely so heavily upon the County to provide services, this action is a multi-jurisdictional action because it benefits both the County and all the participating Cities. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Identify appropriate training for Road Department Staff. • Seek funding to support training. • Identify appropriate funding source for the purchase of firefighting equipment such as fire pants, shirts, fire shelters, and web gear. • Continue annual trainings on fire shelters and secure larger shelters. 			
Does the action alleviate long-term risk from future conditions including climate change?		No	
Benefit to Underserved/Socially Vulnerable Population		No	
Coordinating Organization		Gilliam County Fire Services	
Internal Partners:		External Partners:	
Gilliam County; Cities of Arlington, Condon, and Lonerock; North and South Gilliam Rural Fire Protection District		Oregon State Fire Marshal, Oregon Department of Emergency Management, Oregon Department of Forestry, Bureau of Land Management, US Forest Service	
Potential Funding Sources:		Timeline:	
Oregon State Fire Marshal, Assistance to Firefighter Grants,		Ongoing	
Form Submitted by:	Gilliam County		
Action Item Status:	Ongoing and Modified from 2018 NHMP. Included in the 2022 Community Wildfire Protection Plan.		

Wildfire #2

Proposed Action Item: WF#		Alignment with Plan Goals:	
Create fuel and/or firebreaks around vulnerable facilities through fire resistant plants, installed gravel/hardscaping or through vegetation management. Purchase equipment and supplies for establishing fuel breaks, including irrigation type water line, vegetation control devices and other equipment.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p>	
Rationale for Proposed Action Item			
<ul style="list-style-type: none"> • In a self-completed hazard analysis, Gilliam County reported itself as being highly vulnerable to wildfire as well as a high probability of future wildfire events. • Natural local vegetation increases fire risk; fuel or fire breaks greatly reduce risk. • By encouraging multiple options for fire breaks, it is more likely they will be effective based on time, funding, environment, and personnel resources. Some locations are prime candidates for vegetative fuel breaks, while others would benefit from a hardscaping approach. • Gilliam County has several critical areas in the county that are overgrown with annual grasses including cereal rye and cheatgrass which form dense stands of continuous fine flashy fuels. Reducing these fuels prior to a wildfire is important mitigation, especially in difficult to reach and/or isolated locations. • Several of these overgrown areas are located on steep slopes, or in environmentally sensitive areas, making it difficult for responders to reach in a timely or safe fashion. • Establishing fuel/firebreaks prior to a wildfire will enhance community safety and security and reduce the impact of wildland fires. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Determine locations for fire breaks and fuel breaks. Use Gilliam County Vegetation Management Plan and the Soil and Water Conservation district to help determine critical areas. • Plant fire resistant vegetation around city boundaries in WUI areas where they can be maintained. • Install hard water lines in locations not suited for vegetation management. • Enhance collaboration between internal and external partner agencies, and private landowners. • Engage with landowners in high-risk locations for fuel break installation. • Secure project funding. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Fire Services	
Internal Partners:		External Partners:	
Soil and Water Conservation District, North and South Gilliam County Rural Fire Protection District, Gilliam County Emergency Management		Federal Emergency Management Agency, Oregon State Fire Marshal, National Fire Protection Association, Natural Resource Conservation Service, OSU Extension Service	
Potential Funding Sources:		Timeline:	
Oregon State Fire Marshal Community Risk Reduction Grants		Short term (1-2 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Deferred and Modified from 2018 NHMP. Included in the 2022 Community Wildfire Protection Plan.		

Wildfire #3

Proposed Action Item: WF#3		Alignment with Plan Goals:	
Work with Day Wireless to ensure weed/vegetation mitigation is performed around critical communication towers.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item			
<ul style="list-style-type: none"> • Communications towers are critical infrastructure in Gilliam County. Often they are situated in the middle of large fields of invasive annual grasses a long distance from Fire Response Personnel. • Ensuring that vegetation mitigation actions are taken before a wildfire is essential to keeping this critical infrastructure functioning. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Reach out to Day Wireless to determine if they have a vegetation management plan. • Explore option of County Agencies contracting with Day Wireless for vegetation management, such as the Weed Department. 			
Does the action alleviate long-term risk from future conditions including climate change?		No	
Benefit to Underserved/Socially Vulnerable Population		No	
Coordinating Organization	Gilliam County Emergency Management		
Internal Partners:		External Partners:	
Gilliam County Weed Department, Public Works		Day Wireless	
Potential Funding Sources:		Timeline:	
Day Wireless Funds		Long Term (3-5 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed during the 2024 NHMP update.		

Wildfire #4

Proposed Action Item: WF#4		Alignment with Plan Goals:	
Create a county-wide landowner outreach program to educate and incentivize defensible space best practices, including defensible space around homes, using fire resistant plants in landscaping and other established methods.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item			
<ul style="list-style-type: none"> Understanding of a hazards risk empowers the public to use their resources more effectively to prepare for it. With limited agency resources available, it is necessary for the residents and general public to reduce their risk as much as possible prior to an emergency. Fire response times average 20 minutes throughout the county due to limited volunteer personnel and large distances covered by Fire Districts. Limited City, County and Emergency response personnel necessitate that landowners take responsibility for their own fire mitigation actions, to reduce their potential for injury and property loss during a wildfire event. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Increase public outreach through programs such as Firewise USA and Fire Adapted Oregon to encourage private citizens to conduct their own vegetation management. Support OSFM Home Ignition Zone Inspection Program to educate landowners on defensible space and how they can prepare their homes best to survive a wildfire. Work with OSFM and OSU to disseminate information on Fire Resistant Plants. Explore establishing a fire-resistant plant program in the county. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Fire Services	
Internal Partners:		External Partners:	
North and South Gilliam Rural Fire Protection Districts, Gilliam County Emergency Management, Soil and Water Conservation District		Oregon State Fire Marshal, Oregon Department of Emergency Management, National Fire Protection Association, Natural Resource Conservation Service, OSU Extension Service	
Potential Funding Sources:		Timeline:	
Oregon State Fire Marshal Grants USDA Community Wildfire Defense Grant		Ongoing	
Form Submitted by:		Gilliam County Fire Services	
Action Item Status:		Developed during the 2024 NHMP update. Included in the 2022 CWPP.	

Wildfire #5

Proposed Action Item: WF#5		Alignment with Plan Goals:	
Develop a program for prescribed animal grazing in high-risk areas throughout the County, including exploring a cost share option with private landowners.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p>	
Rationale for Proposed Action Item			
<ul style="list-style-type: none"> Gilliam County has several critical areas in the county that are overgrown with annual grasses including cereal rye and cheatgrass which form dense stands of continuous fine flashy fuels. Reducing these fuels prior to a wildfire is an important mitigation technique, especially in difficult to reach and/or isolated locations. Several of these overgrown areas are located on steep slopes, or in environmentally sensitive areas. Prescribed grazing is an environmentally friendly and frequently cost-effective method of managing large areas of vegetation on difficult terrain. Some landowners may have difficulty paying for, or even locating a prescribed grazing company, so a City or County cost share could help locate potential contractors and offset costs. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Develop a cost-share program for prescribed grazing at the city and/or county level. Apply for fire mitigation funding. Use that funding to pay for prescribed grazing on county land and private property, targeting high risk areas. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes.	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Fire Services	
Internal Partners:		External Partners:	
Cities of Arlington, Condon and Lonerock, North and South Gilliam Rural Fire Protection Districts, Gilliam County Emergency Management, Soil and Water Conservation District		Oregon State Fire Marshal, Oregon Department of Emergency Management, National Fire Protection Association, Natural Resource Conservation Service, OSU Extension Service	
Potential Funding Sources:		Timeline:	
USFS community Wildfire Defense Grant USFW Wildland Urban Interface Community Assistance Grant COCO AIM Grant		Ongoing	
Form Submitted by:		Gilliam County Fire Services	
Action Item Status:		Developed for the 2024 NHMP	

Wildfire #6

Proposed Action Item: WF#6		Alignment with Plan Goals:	
Develop a fire prevention sign program with important State, Federal and Local partners; including but not limited to Bureau of Land Management, Oregon Parks and Recreation Department, Sherman County, Wheeler County, Travel Oregon, Oregon State Fire Marshal, Oregon Department of Transportation, etc.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item			
<ul style="list-style-type: none"> Gilliam County has several landowning entities, including Federal, State, local government, and private individuals. Standardizing fire prevention/fire danger signs across this broad range of entities is important to eliminate confusion and provide the most impact. OPRD, BLM and ODOT have different requirements for signs, and it is important to have permission for individual landowners and ensure a sign can be placed in a planned location prior to purchasing a sign. During the summer, when fire danger is highest, Gilliam County is traveled by a large number of tourists, and ensuring they know what the fire regulations are, including burn bans is important to public safety. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Coordinate with Federal, State and Local agencies to determine what their sign requirements are. Work with the Northwest Passage Fire Prevention Co-Op to ensure consistent messaging across the region and different agencies. Prior to buying any signage, confirm with ODOT/OPRD/BLM that they can be placed in their desired location. 			
Does the action alleviate long-term risk from future conditions including climate change?		No	
Benefit to Underserved/Socially Vulnerable Population		No	
Coordinating Organization	Gilliam County Fire Services		
Internal Partners:		External Partners:	
North and South Gilliam Rural Fire Protection Districts, Gilliam County Emergency Management		Oregon State Fire Marshal, Bureau of Land Management, Oregon Parks and Recreation Department, Sherman County, Wheeler County, Morrow County, Travel Oregon, Oregon Department of Transportation, Oregon Department of Emergency Management	
Potential Funding Sources:		Timeline:	
BLM Fire Mitigation Grants OSFM Wildfire Mitigation Funding USFS Community Wildfire Defense Grants		Long Term (3-5 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed during the 2024 NHMP update. Included in the 2022 Community Wildfire Protection Plan		

Wildfire #7

Proposed Action Item: WF#7		Alignment with Plan Goals:	
Complete a road, culvert, stream crossing and railroad crossing assessment to address existing situations which could result in problems for evacuation of residents and limit fire apparatus during a wildfire response.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 4: Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.</p>	
Rationale for Proposed Action Item			
<ul style="list-style-type: none"> Gilliam County has several dirt roads, small streams and in the north end of the county, railroad tracks that cross major roads in six locations. Knowing the high-risk areas, such as roads that need to be improved to prevent washing out from rain or blowing out from winds, as well as how often first responders can be delayed by trains is essential for the County's safety. Predetermined evacuation routes prior to an emergency are also dependent on a road assessment and knowing which roads are likely to be used, and which ones are likely to be not functional. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Coordinate with the Gilliam County Road Department and ODOT on County and State maintained roads. Coordinate with Waste Management, Union Pacific and Watco on railroad crossings. Coordinate with SWCD and NRCS on stream crossings assessments. 			
Does the action alleviate long-term risk from future conditions including climate change?		No.	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
Cities of Arlington, Condon and Lonerock, Gilliam County Road Department, Gilliam County Planning Department, North and South Gilliam EMS, North and South Gilliam Rural Fire Protection Districts, Soil and Water Conservation District		Oregon State Fire Marshal, Oregon Department of Emergency Management, Natural Resource Conservation Service, Oregon Department of Transportation, Union Pacific Railroad, Watco, Waste Management	
Potential Funding Sources:		Timeline:	
ODOT USFS Community Wildfire Defense Grants		Long Term (3-5 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed during the 2024 NHMP update. Included in the 2022 Community Wildfire Protection Plan		

Wildfire #8

Proposed Action Item: WF#8		Alignment with Plan Goals:	
Assist Rural Fire Protection Districts in upgrading their firefighting equipment to increase wildland firefighting capabilities and capacity.		Goal 1: Safety of life and the preservation of property and industry Goal 2: Increased cooperation and collaboration between groups and agencies.	
Rationale for Proposed Action Item			
<ul style="list-style-type: none"> North and South Gilliam County Rural Fire Protection Districts are volunteer agencies with limited budgets. Both agencies have a limited number of personnel, and having updated, easy to use and reliable equipment is essential for each agency's response efficiency. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Use Federal Excess Personal Property Program (FEPP) to obtain fire response equipment from other federal agencies. Apply for funding through Oregon State Fire Marshal to purchase new equipment, being cognizant of prolonged wait times for new equipment. 			
Does the action alleviate long-term risk from future conditions including climate change?		No	
Benefit to Underserved/Socially Vulnerable Population		No	
Coordinating Organization		Gilliam County Fire Services	
Internal Partners:		External Partners:	
North and South Gilliam Rural Fire Protection Districts, Gilliam County Emergency Management		Oregon State Fire Marshal, Oregon Department of Emergency Management, Federal Emergency Management Agency	
Potential Funding Sources:		Timeline:	
Federal Excess Property Program Oregon State Fire Marshal		Ongoing, Long Term (3-5 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed during the 2024 NHMP update and included in the 2022 Community Wildfire Protection Plan.		

Wildfire #9

Proposed Action Item: WF#9		Alignment with Plan Goals:	
Promote the use of wildfire and drought resistant around homes and businesses.		Goal 1: Safety of life and the preservation of property and industry Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.	
Rationale for Proposed Action Item			
<ul style="list-style-type: none"> Gilliam County annually receives 9-14 inches of rain per year, making wildfire and drought resistant plants an important part of overall county preparedness. Often drought resistant plants are not fire resistant, for example, drought resistant ornamental rosemary is highly flammable and should not be planted within 30 feet of a home. Planning landscapes for wildfires and droughts can assist with fire mitigation, water savings, and make communities more resilient to climate change. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Coordinate with SWCD and Gilliam County Weed Department on funding sources and procedures. Develop a resource list for residents that includes where wildfire and drought resistant plants can be purchased. Have information on Firewise plants and drought resistant plants available at major locations, such as City Halls, Community Bulletin Boards and Post Offices. 			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		No	
Coordinating Organization		Gilliam County Fire Services	
Internal Partners:		External Partners:	
Cities of Arlington, Condon and Lonerock Gilliam County Emergency Management, North and South Gilliam Rural Fire Protection Districts, Soil and Water Conservation District, Private Landowners		Oregon State Fire Marshal, Oregon State University Extension, Natural Resource Conservation Service, United States Department of Agriculture	
Potential Funding Sources:		Timeline:	
Oregon State Fire Marshal SWCD/NRCS Funding NRCS EQUIP		Short Term (1-2 years)	
Form Submitted by:		Gilliam County	
Action Item Status:		Developed during the 2024 NHMP update and included in the 2022 Community Wildfire Protection Plan.	

Wildfire #10

Proposed Action Item: WF#10		Alignment with Plan Goals:	
Reduce wildfire fuel load through weed abatement projects and fuel/fire breaks in the City of Arlington.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p>	
Rationale for Proposed Action Item			
<ul style="list-style-type: none"> Overgrown annual grasses including rye and cheatgrass form a dense stand of continuous fine flashy fuels in and around Arlington. Arlington's proximity to I-84 increases the risk of ignition of wildfires. The mix of sagebrush, live and dead trees and annual grasses in high-risk areas of the city (I-84 access ramps) create a mix of easily ignitable fast burning and slower burning fuels. Arlington is located mainly on slopes, which influence extreme fire behavior. The entire City is considered wildland urban interface with a high probability of wildfire. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Implement prescribed grazing on hillsides too steep to mow. Use funds from Oregon State Fire Marshal Community Wildfire Risk Reduction grant to implement a grazing cost share program, vegetation management tool inventory and micro grant program to incentivize residents to perform mitigation activities on their own property. 			
Does the action alleviate long-term risk from future conditions including climate change?		No.	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population, youth population and low income.	
Coordinating Organization		City of Arlington	
Internal Partners:		External Partners:	
Gilliam County Fire Services, North Gilliam County Rural Fire Protection District, Soil and Water Conservation District		Oregon State Fire Marshal, Oregon Department of Emergency Management, Natural Resource Conservation Service, OSU Extension Service	
Potential Funding Sources:		Timeline:	
Oregon State Fire Marshal Community Wildfire Risk Reduction Grant USFS Community Wildfire Defense Grants Soil and Water Conservation District		Ongoing	
Form Submitted by:	Gilliam County		
Action Item Status:	Completed, Deferred and Modified from 2018 NHMP. Included in the 2022 Community Wildfire Protection Plan		

Wildfire #11

Proposed Action Item: WF#11		Alignment with Plan Goals:	
Conduct weed abatement to reduce wildfire risk through maintenance of yard and roadside vegetation in the City of Lonerock.		<p>Goal 1: Safety of life and the preservation of property and industry</p> <p>Goal 2: Increased cooperation and collaboration between groups and agencies.</p> <p>Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.</p>	
Rationale for Proposed Action Item			
<ul style="list-style-type: none"> Overgrown annual grasses including rye and cheatgrass form a dense stand of continuous fine flashy fuels intermixed with live and dead juniper in and around Lonerock. Lonerock's extreme isolation means assistance in a wildfire scenario is a minimum of 30 minutes away. Lonerock is surrounded by steep slopes, which influence extreme fire behavior. The entire City is considered wildland urban interface with a high probability of wildfire. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Institute a community wide wildfire mitigation day in Lonerock, bring in volunteer groups from Arlington and/or Condon to provide labor assistance. Pursue Lonerock becoming a Firewise Community, use partnership with OSFM and USFS through that program to strengthen Lonerock's wildfire mitigation practices. 			
Does the action alleviate long-term risk from future conditions including climate change?		No	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, including large elderly population and low income.	
Coordinating Organization		Gilliam County Fire Services	
Internal Partners:		External Partners:	
South Gilliam County Rural Fire Protection District, Gilliam County Emergency Management, Soil and Water Conservation District		Oregon State Fire Marshal, US Forest Service, Natural Resources Conservation Service, OSU Extension Service	
Potential Funding Sources:		Timeline:	
Oregon State Fire Marshal Gilliam County Fire Services US Forest Service		Ongoing	
Form Submitted by:	Gilliam County		
Action Item Status:	Completed, Deferred and Modified from 2018 NHMP. Included in the 2022 Community Wildfire Protection Plan.		

Extreme Weather

Extreme weather is a new category in 2024, and there were no 2018 mitigation actions. There is one mitigation action for the 2024 NHMP update.

- 1) Increase outreach and provide assistance to county residents for utilizing the EnergyTrust of Oregon to help with insulation, energy efficient heat pumps and improving their homes resilience to cold and heat. Additionally provide information on energy efficiency/cost savings programs available through Columbia Basin Electric Coop and Pacific Power.

Status: *Developed for the 2024 NHMP.*

Extreme Weather #1

Proposed Action Item: EW#1		Alignment with Plan Goals:	
Increase outreach and provide assistance to county residents for utilizing the EnergyTrust of Oregon to help with insulation, energy efficient heat pumps and improving their homes resilience to cold and heat. Additionally provide information on energy efficiency/cost savings programs available through Columbia Basin Electric Coop and Pacific Power.		Goal 1: Safety of life and the preservation of property and industry Goal 3: Motivate the whole community, including public, private sector and government agencies to mitigate against the effects of natural hazards through information and education.	
Rationale for Proposed Action Item:			
Gilliam County has a proportion of vulnerable communities who are particularly susceptible to extreme temperatures. The State of Oregon and servicing utility companies have several programs available to assist residents with improving the energy efficiency of their homes to combat extreme temperatures.			
Without financial assistance, many people will be unable to heat or cool their homes. While Gilliam County cannot pay for each resident, they can make sure all residents are aware of financial assistance options available to ensure they can cool or heat their own residences and not rely on municipal heating and cooling centers, which many citizens are reluctant to use.			
Ideas for Implementation:			
Obtain outreach materials from EnergyTrust of Oregon. Determine what programs for individuals are available through Pacific Power and Columbia Basin Electric Coop Work with Gilliam County Senior and Family services and Gilliam County Public Health to help get information to residents in need. Make materials available at high traffic areas in Condon and Arlington, including Senior Meal Sites, Childcare Centers, and City Halls.			
Does the action alleviate long-term risk from future conditions including climate change?		Yes	
Benefit to Underserved/Socially Vulnerable Population		Serves the entire community, specifically targeting large elderly population, youth population and low income.	
Coordinating Organization		Gilliam County Emergency Management	
Internal Partners:		External Partners:	
Cities of Arlington, Condon and Lonerock Gilliam County Public Health, Gilliam County Senior, and Family Services		EnergyTrust of Oregon, Utility Companies, Oregon Department of Emergency Management, Oregon Department of Health, and Human Services	
Potential Funding Sources:		Timeline:	
EnergyTrust of Oregon, Utility Companies		Short Term (1-2 years)	
Form Submitted by:	Gilliam County		
Action Item Status:	Developed for the 2024 NHMP		

APPENDIX B: PLANNING AND PUBLIC PROCESS

This appendix describes the changes made to the 2018 Gilliam NHMP Natural Hazards Mitigation Plan (NHMP) during the 2024 plan update process.

Project Background

Gilliam County collaborated with Fair Winds Consulting, LLC to update the 2018 Gilliam County NHMP. The Disaster Mitigation Act of 2000 requires communities to update their NHMPs every five years to remain eligible for Hazard Mitigation Assistance (HMA) funds through the Building Resilient Infrastructure and Communities program, Flood Mitigation Assistance (FMA) program, and the Hazard Grant Mitigation Program (HMGP). Steering Committee members from Gilliam County and participating Cities met to update their NHMP. Participating Cities are the Cities of Arlington, Condon, and Lonerock. Major changes to the 2018 NHMP are documented and summarized in this appendix.

2024 Plan Update Changes

The sections below only discuss *major* changes made to the 2018 NHMP during the 2024 plan update process. Major changes include the replacement or deletion of large portions of text, changes to the plan's organization, addition of new hazards, updated hazard risk and vulnerability assessment, and new mitigation action items. If a section is not mentioned then it can be assumed that no significant changes occurred.

Front Pages

Acknowledgments have been updated to include the 2024 project partners and planning participants.

The FEMA approval letter, review tool, and County and City resolutions of adoption are included.

Volume I: Multi-Jurisdictional Natural Hazards Mitigation Plan

Volume I provides the overall plan framework for the 2024 NHMP update, including the following sections:

Executive Summary

The 2024 NHMP includes an updated plan summary that provides information about the purpose of natural hazards mitigation planning, key points from the NHMP update process, and describes how the plan will be implemented.

Section 1: Introduction

Section 1 introduces the concept of natural hazards mitigation planning and answers the question, "Why develop a mitigation plan?" Additionally, Section 1 summarizes the 2024 plan update process, and provides an overview of how the plan is organized.

Section 2: Risk Assessment

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

- Hazard characteristics, probability, and vulnerability information updates.
- Addition of another identified natural hazard, extreme weather.
- Population vulnerability trends and significant statistics.
- National Flood Insurance Program (NFIP) information.
- The Hazard Vulnerability Analysis tool.

Section 3: Mitigation Strategy

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

Mission and Goals were reviewed and compared with the State NHMP Mission and Goals, changes were made and are described in the meeting notes, included in this section. The largest change was adding Goal 4: Enhance communication, collaboration and coordination among agencies at all levels of government, sovereign tribal nations and the private sector to mitigate natural hazards.

The Gilliam County Steering Committee met to review the previous NHMP action items. Steering Committee members provided updates and edits to the mitigation actions where applicable including the revision and consolidation of existing actions, managing department/agency designations, time frame, and potential funding sources. See Tables B-1 and B-2 for changes for the County and Cities mitigation actions.

A list of prioritized actions for the County and Cities is included in Section 3, tables Table 3.1 and 3.2. New action items are based upon current needs based upon the community risk assessment. Current activity for institutionalized mitigation activities was described and is included in Section 3.

The 2018 Mitigation Actions are listed below, including the progress achieved since the 2018 update, the 2024 status of the action item, and the rationale for that status. New Mitigation Actions developed during the 2024 update are listed after the 2018 actions. See Section 3 Mitigation Strategy for mitigation actions that the 2024 NHMP has identified to move forward.

Key:

- Action Item: Identifies Action Item according to 2018 item number. Hazards are indicated by the following abbreviations;
 - MH = Multi-Hazard
 - DR = Drought Hazard
 - FL = Flood Hazard
 - EQ = Earthquake Hazard

- VL= Volcanic Event
 - WF = Wildfire
 - WD = Windstorm
 - WS = Winter Storm
 - EW = Extreme Weather (Note: The 2018 NHMP did not include extreme weather as a hazard.)
- Action Title: Short descriptor of mitigation action
 - Progress/Update: An overview of the progress made since 2018 for the listed mitigation action
 - Status: Steering Committee determination on whether to defer, modify or eliminate 2018 actions in the 2024 plan.
 - For the purposes of this plan “defer” indicates action was retained without changes; these actions remain priorities of the County and project partners, timelines, and implementation remains the same.
 - “Modify” indicates that the action remains priority, and some element of the project has been updated (for instance, implementation focus, timeline, or project lead), and the action title remains consistent with the 2018 title.
 - “Eliminate” indicates an action is not included in the 2024 update.
 - Status Comments: The rationale supporting the Steering Committee status determination.

Table B-1: 2018 Mitigation Action Updates

2018 Action Item	2018 Action Item Title	2024 Update/Progress	2024 Status	2024 Status Comments
MH #1	Provide public information regarding natural hazards via website posting, social media, newsletters, mailings, and distributed flyers.	This is an ongoing item. The GC Emergency Manager performs this action quarterly, with Cities and the Fire Districts providing occasional assistance.	Modify	This item has been retained, but also expanded on to include all other incidents.
MH #2	Seek funding for the implementation of priority projects that reduce the vulnerability of critical public facilities in Gilliam County.	Improved facilities include the Condon Grade School and Condon Fire Station.	Modify	Infrastructure improvements remain a priority. Priority infrastructures were identified in 2024 mitigation actions.
MH #3	Develop and maintain a comprehensive impact database on severe natural hazard events in Gilliam County.	The Emergency Manager maintains a database and updates it after every major disaster and wildfire incident.	Defer	This is a continuous process.
MH #4	Seek funding for generators for critical facilities.	Funding for a generator was secured for the Fair Grounds. The new Condon Grade School was wired for a generator.	Modify	This remains a priority. Specific critical facilities were listed in 2024 mitigation actions.
DR #1	Improve long range water sources; increase storage through deeper wells.	No progress was made on this item.	Defer	This remains relevant and funding will be pursued to complete this action.
EQ #1	Seek funding through the State Office of Emergency Management, OEM and/or the Federal Emergency Management Agency (FEMA) to seismically retrofit critical facilities rate with either a very high or high collapse potential rate by the Department of Geology and Mineral Industries (DOGAMI).	A new Condon Grade School was built to replace the one with high seismic vulnerability.	Defer/Modify	This remains a priority, as both Arlington Schools have a high and very high probability of collapse. Other facilities that need to be retrofitted have been listed in 2024 action items.
FL #1	Coordinate with the State Floodplain Coordinator and the Department of Land Conservation and Development (DLCD) to obtain updated floodplain information for Gilliam County and the incorporated Cities.	FEMA is currently updated Gilliam County FIRMs.	Defer	This action is currently taking place with assistance from the County and incorporated cities.
WF#1	Provide Gilliam County Road Department with Fire Fighting training and equipment.	Wildfire trainings are provided, and radios are synchronized to the same channels.	Defer	This action remains a priority, and due to the close relationship of the road department and fire district, will remain ongoing.
WF #2	Create Firebreaks with fire resistant plantings around vulnerable facilities.	Firebreaks were created using other methods, such as disk lines.	Defer/Modify	Firebreaks remain a priority. This action was updated to include specific vulnerable facilities and different methods of creating fuel/fire breaks.

2018 Action Item	2018 Action Item Title	2024 Update/Progress	2024 Status	2024 Status Comments
Arlington WF#1	Reduce Wildfire fuel load through weed abatement projects and firebreaks.	Arlington enforces a weed abatement regulation within their City limits.	Defer/Modify	This action remains an ongoing priority. Specific methods for weed abatement were included in 2024 action items.
Arlington EQ#1	Source generators for city halls and schools (designated shelter sites)	Generators were not acquired for any facilities in Arlington.	Defer/Modify	This remains a priority for Arlington. Specific facilities were listed in 2024 Action Items.
Arlington WS #1	Public outreach to residents regarding sidewalk maintenance during freezing rain events.	The City of Arlington notifies residents during freezing rain events.	Defer/Modify	This action is ongoing and performed every time that there is freezing rain, or other winter storm event.
Condon WS #1	Seeking funding for a generator for City Hall.	City Hall did not receive a generator.	Eliminate	A generator in City Hall is no longer a priority and is not a project Condon wants to pursue.
Condon WS #2	Conduct public outreach and notification about protecting pipes during extreme cold periods.	The City of Condon conducts public outreach in the winter to help inform residents.	Defer/Modify	This action is ongoing and performed every winter, along with outreach on other winter storm hazards.
Condon WS #3	Seeking funding for more snow removal equipment.	The City of Condon received funding for a snowplow and is looking for funding for another one.	Defer	The City has aging equipment that still needs updated.
Condon FL #1	Pursue more recent floodplain information, update floodplain maps.	FEMA is currently updating floodplain maps for Gilliam County, including Condon.	Defer	This action is currently taking place with assistance from the County and incorporated cities.
Lonerock WF #1	Weed abatement; decrease wildfire risk through maintenance of yard and roadside vegetation.	Lonerock annually performs weed abatement activities, maintaining yard and roadside vegetation.	Defer	Ongoing and remains a priority for the City annually.
Lonerock FL #1	Maintain and upgrade Lonerock Bridge; remove willows from creek bed and replace current bridge with free standing bridge.	A new bridge was built in 2021.	Eliminate	Completed
Lonerock WS #1	Paving the "grade" Lonerock Road, to reduce icy conditions and accidents in the winter.	The grade was paved in 2021.	Eliminate	Completed

Source: Gilliam County Steering Committee, City of Arlington, Condon, and Lonerock Steering Committees, 2023

Table B-2 New Mitigation Actions (2024)

2024 Action Item	2024 Action Item Title	Coordinating Organization	Timeline
MH #5	Work with OEM to establish a 2 Weeks Ready Program in Gilliam County.	Gilliam County Emergency Management	Short Term (1-2 Years)
MH #6	Increase the number of people signed up for Frontier 911 Alerts.	Gilliam County Emergency Management	Short Term (1-2 Years)
MH #7	Work with critical businesses for backup power and internet, including gas stations and grocery stores.	Gilliam County Emergency Management	Long Term (3-5 years)

2024 Action Item	2024 Action Item Title	Coordinating Organization	Timeline
MH #8	Install a HAM radio repeater at the Condon Radar Base/Richmond Road Community	Richmond Road Community	Ongoing
MH #9	Obtain radios for public works to better communicate with the Road Department, Fire Protection Districts and ODOT during hazardous situations.	Gilliam County Emergency Management	Short Term (1-2 Years)
MH #10	Establish the Gilliam County Fair Grounds in Condon as a multi-purpose Community Resilience Center to provide shelter and resources during fire, climate, and other emergencies. Install backup generators to power buildings with emergency shelter capabilities, air filtration systems and air conditioning systems.	Gilliam County Emergency Management	Long Term (3-5 years)
MH #11	Establish a multi-purpose Community Resilience Center in the City of Arlington to provide shelter during fire, climate, and other emergencies. Install back-up generators to power buildings with emergency shelter capabilities, air filtration systems and air conditions systems.	Gilliam County Emergency Management, City of Arlington	Long Term (3-5 years)
MH #12	Install a Generator at Lonerock Community Center for a resilience center to provide shelter and resources during climate and other emergencies.	Gilliam County Emergency Management, City of Lonerock	Long Term (3-5 years)
DR #2	Conduct public outreach on water use and water saving techniques during periods of drought.	Gilliam County Emergency Management	Ongoing
DR #3	Conduct a groundwater assessment in Condon.	City of Condon	Long Term (3-5 years)
DR #4	Update the City of Condon's water supply, including installing a new water transmission line from City Farm (well location) to the City of Condon and a new telemetry system.	City of Condon	Long Term (3-5 years)
EQ #2	Increase public outreach for earthquake education.	Gilliam County Emergency Management	Ongoing
EQ #3	Seismically retrofit facilities not included in the DOGAMI 2006 assessment: Arlington Medical Clinic, South Gilliam Health Center, Arlington City Hall, Gilliam County Road Department Building, Arlington Childcare Center, and Condon Childcare center.	Gilliam County Planning Department, Cities of Arlington, and Condon	Long Term (3-5 years)
WS #1	Work with ODOT on traffic patterns for rerouting major routes such as I-84 during winter storms; remove Highways 74 and 206 from I-84 alternate routes.	City of Condon	Short Term (1-2 Years)
WF #3	Work with Day Wireless to ensure weed/vegetation mitigation is performed around critical communications towers.	Gilliam County Emergency Management	Long Term (3-5 years)
WF #4	Create a county-wide landowner outreach program to educate and incentivize defensible space best practices, including defensible space around homes, using fire resistant plants in landscaping and other established methods.	Gilliam County Fire Services	Ongoing
WF #5	Develop a program for prescribed animal grazing in high-risk areas throughout the County, including exploring a cost share option with private landowners.	Gilliam County Fire Services	Ongoing
WF #6	Develop a fire prevention sign program with important State, Federal and local partners; including but not limited to Buruea of Land Management, Oregon Parks and Recreation Department, Sherman County, Wheeler County, Travel Oregon, Oregon State Fire Marshal, Oregon Department of Transportation, etc.	Gilliam County Fire Services	Long Term (3-5 years)

2024 Action Item	2024 Action Item Title	Coordinating Organization	Timeline
WF #7	Complete a road, culvert, stream crossing and railroad crossing assessment to address existing situations which could result in problems for evacuation of residents and limit fire apparatus during a wildfire response.	Gilliam County Emergency Management	Long Term (3-5 years)
WF #8	Assist Rural Fire Protection Districts in upgrading their firefighting equipment to increase wildland firefighting capabilities and capacity.	Gilliam County Fire Services	Ongoing, Long Term (3-5 years)
WF #9	Promote the use of wildfire and drought resistant plants around homes and businesses.	Gilliam County Fire Services	Short Term (1-2 Years)
EW #1	Increase outreach and provide assistance to county residents for utilizing the EnergyTrust of Oregon to help with insulation, energy efficient heat pumps and improving their homes resilience to cold and heat. Additionally provide information on energy efficiency/cost savings programs available through Columbia Basin Electric Coop and Pacific Power.	Gilliam County Emergency Management	Short Term (1-2 Years)

^For more information on partner organizations and potential funding sources, see Appendix A: Action Item Forms. Source: Gilliam County Steering Committee, City of Arlington, Condon, and Lonerock Steering Committees, 2023

Please see Section 3, Mitigation Strategy, for a full list of 2024 mitigation actions, including previously developed and retained actions as well as new actions. For 2024, City mitigation actions were included in the overall county list, due to how much support each city receives from the county. Actions for both the County and Cities are described in Tables 3.1 and 3.2. Implementation and integration strategies for the NHMP with County plans and policies was expanded upon.

Section 4: Plan Implementation and Maintenance

The Natural Hazards Mitigation Steering Committee (NHMSC) informally met several times since the previous version of this NHMP. Progress towards action items is documented in Section 3 (above). The NHMSC agreed to meet semi-annually and the Gilliam County Emergency Management Department will be the convener of these meetings, as well as the entity responsible for coordinating implementation and future updates. The NHMSC will discuss options to integrate the NHMP into other planning documents (including the comprehensive plan) and revisit funding options during their semi-annual meetings. They will also monitor and evaluate the plan for effectiveness. The method of evaluation and monitoring was added to this section.

Volume II: Jurisdictional Addenda

The Jurisdictional addenda for each City was updated. Jurisdictional Risk Assessment, Hazard Vulnerability Assessments, demographic data, development and hazard profile were made. The Cities of Arlington, Condon, and Lonerock participated and formed Steering Committees to inform the planning process, and updated the status of 2018 Mitigation Action Items and create new items for 2024.

Volume III: Mitigation Resources

Appendix A: Action Item Forms

This appendix details background, implementation steps, benefits, costs, and importance for all actions included in the 2024 NHMP. Action item forms were either updated from the previous plan or developed as part of this plan update.

Appendix B: Planning and Public Process

This planning and public process appendix reflects changes made to the Gilliam County NHMP and documents the 2024 planning and public process.

Appendix C: Community Profile

The community profile has been updated to include more recent data. Information from the State of Oregon NHMP (2020) was updated.

Appendix D: Economic Analysis

This section was reviewed by Gilliam County Emergency Management and Fair Winds Consulting, LLC for accuracy. Minimal updates were made to this section.

Appendix E: Survey Results

The public outreach survey used and responses collected during the 2024 NHMP update is detailed in this appendix.

Appendix F: Grant Programs

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

Appendix G: Climate Change Influence on Natural Hazards: Overview and Gilliam County Projections

The Oregon Climate Change Research Institute (OCCRI) produced two climate change reports for the 2018 update. OCCRI's Future Climate Projections Gilliam River County and the Climate Change Influence on Natural Hazards in Eight Oregon Counties: Overview of County Reports, provide 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. The overview discusses all eight of the counties while the respective individual county reports are specific to each county. OCCRI's research and analysis focuses on how climate change is expected to influence natural hazards. Since this report made predictions to 2050, a new report was not required.

Public Participation Process

Gilliam County is dedicated to directly involving the public in the review and update of the natural hazard mitigation plan. Although members of the Steering Committee represent the public to some extent, the residents of Gilliam County were also given the opportunity to provide feedback about the Plan.

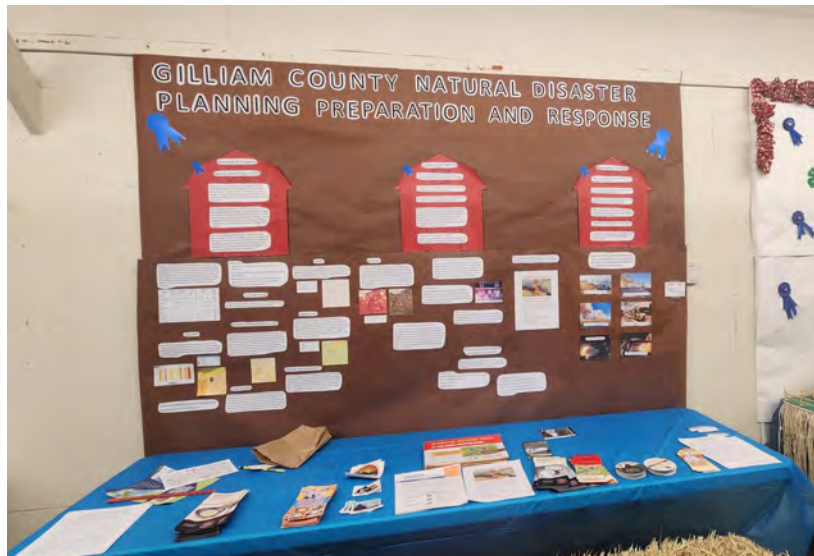
Gilliam County made the draft NHMP available via the County Emergency Management’s website for public comment from February 10, 2024 through the FEMA review period. After FEMA approval, the final NHMP will be posted on the County’s Emergency Management website.

Public Involvement Summary

Gilliam County announced the plan update on the County Sherriff’s websites. Posters with links to the Gilliam County Survey were also posted in major locations throughout the Cities. The draft NHMP was added on February 10th, 2024, and remained there until FEMA approval, at which point the final NHMP was posted.

Fair Winds Consulting attended the Gilliam County Fair and supplied an informational booth. This booth included information on the Natural Hazard Mitigation Plan Update, information on the hazards experienced in Gilliam County, current mitigation actions and a public survey. The booth was displayed from August 29th, 2023 to September 3rd, 2023, and the consultant conducted in person outreach with several residents on the purpose and scope of the Natural Hazard Mitigation Plan.

Figure B-1: Gilliam County Natural Hazards Mitigation Fair Booth



Ten residents responded to the online survey; their answers are detailed in Appendix E. The questions and responses are detailed in Appendix E. Members of the Steering Committee provided edits and updates to the NHMP.

Fair Winds Consulting presented to North Gilliam County Rural Fire Protection District on November 21, 2023 and to South Gilliam County Rural Fire Protection District on November 29, 2023.

Finally, the NHMP Update Coordinator presented at the following public meetings for the County:

Gilliam County Court Public Meeting: Month 2024

On Month Day, 2024 Gilliam County staff briefed the Gilliam County Court on the updated Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan.

City of Arlington City Council Public Meeting: Month 2024

On Month, Day, 2024 the NHMP Update Coordinator briefed the Arlington City Council on the updated Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan.

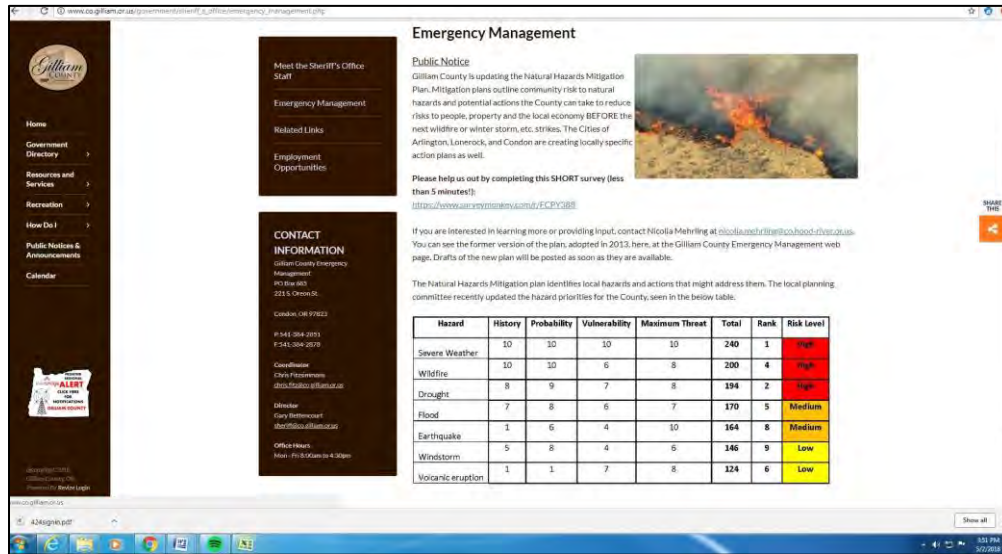
City of Condon City Council Public Meeting: Month 2024

On Month Day, 2024 the NHMP Update Coordinator briefed the Condon City Council on the updated Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan.

City of Lonerock City Council Public Meeting: Month 2024

On Month Day, 2024 the NHMP Update Coordinator briefed the Lonerock City Council on the updated Gilliam County Multi-Jurisdictional Natural Hazards Mitigation Plan.

Figure B-1: Gilliam County Notice



GILLIAM COUNTY NATURAL HAZARDS MITIGATION PLAN SURVEY

PLEASE SCAN THE QR CODE TO PROVIDE US WITH
INFORMATION ON HOW NATURAL HAZARDS IMPACT YOU
AND YOUR FAMILY



Gilliam County Natural Hazards Mitigation Plan Update

Gilliam County Emergency Management is updating their NHMP. The NHMP identifies types of natural hazards that impact a jurisdiction (Arlington, Condon, Lonerock), assesses each jurisdiction's vulnerability to those hazards and formulates mitigation strategies that will lessen the severity of natural disasters by protecting human life and property. Please take the survey to help us know what hazards affect you and help us improve county-wide mitigation efforts!

Gilliam County Steering Committee

Steering Committee members possessed familiarity with the Gilliam County community and how it's affected by natural hazard events. The Steering Committee guided the update process through several steps including goal confirmation and prioritization, mitigation action item review and development and information sharing to update the plan and to make the plan as comprehensive as possible. Members from the Cities of Arlington, Condon and Lonerock Steering Committees also participated in the County Steering Committee meeting that met on the following dates:

Meeting #1: Gilliam County NHMP Steering Committee Meeting #1; Kickoff, Risk Assessment, Hazard Analysis, June 01, 2023

Meeting #2: Gilliam County NHMP Steering Committee Meeting #2: Mitigation Strategies, Implementation and Maintenance, November 06, 2024

In addition, each City held Steering Committee meetings as indicated below:

Arlington Steering Committee Meeting #1; September 26, 2023

Condon Steering Committee Meeting #1; September 26, 2023

Lonerock Steering Committee Meeting #1; October 8, 2023

For a list of meeting attendees see the individual City addendum within Volume II.

The County's and Cities' NHMP reflects decisions made at the plan update meetings, during subsequent work and communication internally between Steering Committee members and other staff, and externally with Fair Winds Consulting, LLC.

The following pages provide copies of meeting agendas, meeting notes, and sign-in sheets from County Steering Committee meetings. Information from the city meetings is also provided with the attendees for each meeting listed. The topics and processes of these meetings are described below.

Gilliam County Risk Assessment Meeting (June 2023)

On June 01, 2023, the Natural Hazards Mitigation Steering Committee (NHMSC) met for a work session to go over and update the County's hazard analysis and risk assessment. The purpose of the meeting was to (1) review and update the mitigation plan's mission statement and goals, (2) gather and update hazard history and probability and vulnerability estimates for each of the hazards identified in the County, (3) update the hazard analysis matrix for each of the hazards, (4) identify community vulnerabilities for each hazard, (5) update critical facilities and infrastructure, and (5) identify the relative risk for each hazard likely to affect the County. Using information gathered from this meeting, the Consultant updated the hazard analysis to include total threat scores, and used these scores to identify hazards that pose the biggest threats to the County. All of the information gathered at this meeting was used to update the Risk Assessment and Hazard Analysis portion of the plan.

Gilliam County Mitigation Strategy (November 2023)

On November 6, 2023 the NHMSC met once again to review and update the mitigation strategy and plan implementation, and the maintenance schedule. The purpose of the first half of the work session was to (1) determine the status and progress of action items in the 2018 mitigation plan, and (2) discuss new action items for the 2024 plan update. The purpose of the second half of the work session was to, (1) identify a convener and coordinating body for continued plan implementation, (2) review and update the method and schedule for monitoring and evaluating the plan, (3) discuss the process for prioritizing mitigation action items, (4) review and edit the finalized sections of the NHMP.

City of Arlington Risk Assessment Meeting (September 2023)

On September 26, 2023, the Consultant, the Gilliam County Emergency Management Coordinator, and representatives from the City of Arlington met to complete a risk assessment for the City through a hazard analysis exercise. The purpose of the meeting was to (1) gather hazard history, probability, and vulnerability estimates for each of the hazards identified in the plan, (2) create the hazard analysis matrix for each of the hazards, (3) identify community vulnerabilities for each hazard addressed in the plan, and (4) compare probability and vulnerability results to the hazard analysis completed by the Gilliam County NHMSC, (5) review 2018 mitigation action items and (6) discuss new action items for the 2024 plan.

City of Condon Risk Assessment Meeting (September 2023)

On September 26, 2023 the Consultant, the Gilliam County Emergency Management Coordinator, and representatives from the City of Condon met to complete a risk assessment for the City through a hazard analysis exercise. The purpose of the meeting was to (1) gather hazard history, probability, and vulnerability estimates for each of the hazards identified in the plan, (2) create the hazard analysis matrix for each of the hazards, (3) identify community vulnerabilities for each hazard addressed in the plan, and (4) compare probability and vulnerability results to the hazard analysis completed by the Gilliam County NHMSC, (5) review 2018 mitigation action items and (6) discuss new action items for the 2024 plan.

City of Lonerock Risk Assessment Meeting (October 2023)

On October 8, 2023, the Consultant, the Gilliam County Emergency Management Coordinator, members of the public, and representatives from the City of Lonerock met to complete a risk assessment for the City through a hazard analysis exercise. The purpose of the meeting was to (1) gather hazard history, probability, and vulnerability estimates for each of the hazards identified in the plan, (2) create the hazard analysis matrix for each of the hazards, (3) identify community vulnerabilities for each hazard addressed in the plan, and (4) compare probability and vulnerability results to the hazard analysis completed by the Gilliam County NHMSC, (5) review 2018 mitigation action items and (6) discuss new action items for the 2024 plan.



Gilliam County NHMP Update Steering Committee Meeting One

Thursday, June 1, 2023

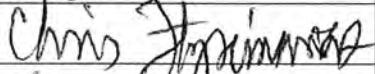

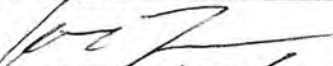

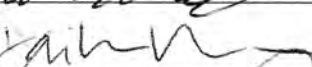
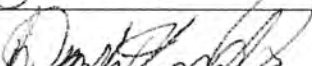
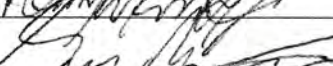
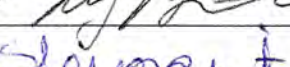
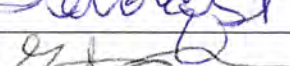
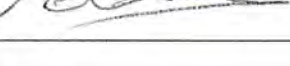
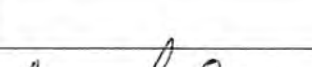

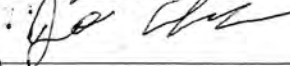
AGENDA

- I. Welcome and Introductions
- II. NHMP Overview
 - a. What, Why and How
 - b. Project Timeline
 - c. Steering Committee Expectations
- III. Community Profile
 - a. Critical Infrastructure and Facilities Review
 - b. County and City Asset Review
 - c. Demographic Information
 - d. Vulnerable Populations
- IV. Goals Update
- V. Hazard Vulnerability Analysis
 - a. Work Session
- VI. Next Steps
 - a. Public Outreach
 - b. Next Meeting
- VII. Adjourn

Gilliam County Natural Hazards Mitigation Plan Steering Committee Meeting

Thursday, June 1, 2023

Please sign in

Full Signature	Name	Title	Representing	Email
	Chris Fitzsimmons	Coordinator	Gilliam County Emergency Management	Chris.fitz@co.gilliam.or.us
	Chet Wilkins	Assessor	Gilliam County Assessor's Office	Chet.wilkins@co.gilliam.or.us
	Casey Zellars	Coordinator	Gilliam County Fire Services	gcfs@ortelco.net
	Cori Mikkalo	NHMP Coordinator	Fair Winds Consulting, LLC, Gilliam County	Cori.mikkalo@fairwindsemergencymanagement.com
	Dailene Wilson		Gilliam County Public Health	dailene@gilliamcountypublichealth.org
	Dewey Kennedy	Road Master	Gilliam County Road Department	Dewey.kennedy@co.gilliam.or.us
	Gary Bettencourt	Sheriff	Gilliam County Sheriff's Office	Gary.bettencourt@co.gilliam.or.us
	Shanna Gronquist	Public Works	City of Arlington	cityofapw@gorge.net
	Gibb Wilkins	Public Works	City of Condon	publicworks@cityofcondon.com
	Herb Winters	District Manager	Soil & Water Conservation District	Herb.gilliamswcd@gmail.com
	Greg Smith	Chief	South Gilliam Co. Rural Fire Protection District	Gregs5338@gmail.com
	Joe Claughton	Chief	North Gilliam Co. Rural Fire Protection District	jclaught@gmail.com
	Jordan Maley	Extension Agent	OSU	Jordan.maley@oregonstate.edu
	Joely Jaeger	Coordinator	Gilliam County Emergency Management	Joely.jaeger@co.gilliam.or.us



Gilliam County Natural Hazard Mitigation Plan Steering Committee Meeting #1 Minutes
Thursday, June 1, 2023

Welcome and Introductions began at 10:00 on Thursday, June 1, 2023.

In Attendance:

Chris Fitzsimmons, NHMP Coordinator, Gilliam County Emergency Management
Chet Wilkins, Assessor, Gilliam County Assessor's Office
Casey Zellars, Operations Chief, Gilliam County Fire Services
Dewey Kennedy, Road Master, Gilliam County Road Department
Dailene Wilson, Gilliam County Public Health
Gary Bettencourt, Sheriff, Gilliam County Sheriff's Office
Shanna Gronquist, Public Works, City of Arlington
Gibb Wilkins, Public Works, City of Condon
Greg Smith, Chief, South Gilliam County Rural Fire Protection District,
Joe Claughton, Chief, North Gilliam County Rural Fire Protection District
Joely Jaeger, Coordinator, Gilliam County Emergency Management
Michelle Colby, Planner, Gilliam County Planning Department
Mike Renault, Regional Mobilization Coordinator, Oregon State Fire Marshal
Nore Wright, Office Manager, Soil and Water Conservation District
Rob Fore, Fuels Specialist, Bureau of Land Management
Richard Fletcher, Rangeland Fire Protection Specialist, ODF
Sheldon Rhoden, Fire Management Specialist/Fire Trespass Coordinator, Bureau of Land Management
Cori Mikkalo, NHMP Update Coordinator, Fair Winds Consulting, LLC
Jodan Maley, Agent, OSU Extension

Absent:

Simone Cordery-Cotter, Fire Risk Reduction Specialist, Oregon State Fire Marshal
Stan Forrest, Mayor, City of Lonerock

As part of the introductions, each person noted their familiarity with Natural Hazards Mitigation Plans (NHMPs) and any previous participation in a NHMP update. Several Steering Committee Members have participated in previous plan updates.

NHMP Overview

Cori Mikkalo led the meeting, Cori is a consultant with Fair Winds Consulting, LLC who is updating Gilliam County's NHMP.



After introductions, Cori explained what a Natural Mitigation Plan was, why Gilliam County has one and how the update process will work. She explained that the purpose of an NHMP is to prepare for the long-term effects resulting from natural hazards, and that natural hazard mitigation is a method of reducing or alleviating the losses of life, property and injuries resulting from natural hazards through long and short-term strategies.

She explained the essential pieces of an NHMP:

Hazards profile: Description of Local Hazards to help the steering committee make decisions about hazard priority.

Community Profile: Overview of physical, natural, demographic, and social community characteristics, intended to highlight vulnerabilities.

Risk Assessment: Identification of priority risks based on hazard and community information.

Mitigation Strategy: Set of Actions the community prioritizes to respond to risks.

City Addendums: Specific information and mitigation actions for the incorporated cities.

She then explained why Gilliam County was updating their NHMP, because mitigation is important because it is a proactive way to eliminate long-term risk to life and property, and it focuses on preventing emergencies or reducing their effects, increasing a community's ability to adapt to, withstand and recover from hazards. NHMPs are required by 44 CFR 201 for jurisdictions to be eligible for certain funding for mitigation projects, and they must be updated every 5 years.

Funding that NHMPs make counties eligible include:

Building Resilient Infrastructure and Communities Grants (BRIC): Provides funding to states, local communities, tribes, and territories as they undertake hazard mitigation projects reducing the risks they face from disasters and natural hazards.

Hazard Mitigation Grant Program (HMGP): provides funding to implement long-term hazard mitigation measures after a major disaster declaration.

Flood Mitigation Assistance Program: Property owners who participated in the FMA program must have flood insurance policy on the structure to be mitigated that is current at the time of application and maintained through award.

Emergency Management Performance Grant (EMPG): ODEM requires current NHMP as part of performance measures to receive funds.

Cori then provided an overview of the timeline. The period of performance for this project is April 2023-October 2024. The first steering committee meeting was today, June 1st, and the



second one will be in the fall, September or October. Also, in the Fall Cori and Chris Fitzsimmons will be meeting with the Cities of Arlington, Condon and Lonerock. The current goal is to have the first draft of the Gilliam County NHMP submitted to OEM by February 2024.

Cori then let the Steering Committee know what their expectations were, which included providing technical advice and policy direction, review drafts, provide information and make high-level decisions regarding NHMP content, identify hazards that affect the community and identify mitigation activities to reduce the impacts of those hazards and that they should attend Steering Committee Meetings.

Community Profile Update

The Steering Committee then reviewed critical infrastructure, critical facilities, vulnerable populations, and new developments in the county. Several updates were made to the County Critical infrastructure including county roads, the Gilliam County Fair Grounds, Frontier Regional 911, Radio Repeaters, Gronquist Building Offices (in Arlington), BPA power stations, Transportation Facility and ODOT facilities. The City of Arlington added Interstate 84 access ramps and North Gilliam County Medic Ambulance. For vulnerable economic assets, the City of Arlington added the Arlington Mesa and Airport, and the City of Condon added the Condon Airport. The vulnerable environmental asset list was also updated, including Adding the Arlington Golf Course. Vulnerable land use and developments were updated to include Solar Farms. Finally, vulnerable populations and high-risk neighborhoods were updated. The City of Arlington added the Columbia River Motor Home and RV Park, Arlington Grade School, Arlington High School, and elderly population. The City of Condon Added the Condon Grade School, Condon High School, and Elderly Population (median age is 65). The City of Lonerock also added their elderly population as a vulnerable community (median age is 61).

The final piece of infrastructure updated was the renewable energy infrastructure list. Several more wind projects have opened, and some have consolidated. The Gilliam County assessor will provide an updated list on operating wind farms.

Basic Gilliam County demographic information was reviewed, including that 29.9% of the population that is 65 years or older and that the median income is \$51,705 (72% of Oregon Median income). Gilliam County's relative social vulnerability according to the CDC was also covered. As of May 2023, the relative social vulnerability index score was 71%.

Goals update:

Cori provided the 2018 NHMP goals, as well as the 2020 State of Oregon NHMP Goals for comparison. The Steering Committee unanimously agreed to keep the original three goals, and to add "Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.



Hazard Vulnerability Analysis

Cori then led the steering committee through a Hazard Vulnerability Analysis work session. It began with a review of the 2018 identified hazards, and then a comparison to the 2020 State of Oregon NHMP identified hazards. In 2020 the State of Oregon Identified extreme heat as a new hazard for Region 5 (which includes Gilliam County) and the State as a whole. The Steering Committee determined that Extreme Weather would fit local needs better than Extreme Heat, and decided that extreme heat events, extreme cold events and summer hailstorm/thunderstorms will all be included under the umbrella of extreme weather. They also decided to keep landslides grouped with winter storms, as the only time Gilliam County experiences landslides is in conjunction with winter storms and it is very infrequent.

The Steering Committee then reviewed the 2018 Oregon Climate Change Research Institute's report on projected changes to Gilliam County weather for the 2020s (2010-2039) and 2050s (2040-2069). Overall climate change models project warmer, drier summers for the region. It is highly likely that Gilliam County will experience increasing wildfire frequency and intensity, increasing extreme heat frequency and severity, as well as an increase in extreme precipitation and extreme river flows. This information was used to help inform the hazard analysis.

Federal and state disaster declaration history was also reviewed, and it was noted that 29 total fires in Oregon from 2018-2023 received Fire Management Assistance FEMA declarations, though none in Gilliam County.

The Steering Committee worked through a hazard analysis for winter storms/landslide, wildfire, drought, windstorm, extreme weather, volcanic event, flood, and earthquake. While working through the hazard analysis they also reviewed climate change predictions to help aid with future probability. Additionally, during this time hazard history tables were reviewed and added on to. Several historical events were added, including winter storms, summer flash flooding, droughts, and extreme heat events.

The results were compared to the 2018 Hazard analysis. Winter storm stayed at high risk, with a score of 240 in 2018 and 2023. Wildfire increased in score from 200 in 2018 to 240 in 2023, and drought remained the third highest ranked hazard at 230 points and increase from 2018. Overall, Gilliam County's hazard rankings stayed the same, with the addition of extreme weather as the 4th highest ranked hazard.



Gilliam County 2023 Hazard History Table

Hazard	History			Vulnerability			Probability			Maximum Threat			Total Threat Score
	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	
Wildfire	10	2	20	10	5	50	10	7	70	10	10	100	240
Winter Storms/Landslides	10	2	20	10	5	50	10	7	70	10	10	100	240
Drought	10	2	20	8	5	40	10	7	70	10	10	100	230
Extreme Weather	8	2	16	8	5	40	10	7	70	10	10	100	226
Floods	7	2	14	6	5	30	8	7	56	7	10	70	170
Earthquakes	2	2	4	4	5	20	6	7	42	10	10	100	166
Windstorms	5	2	10	4	5	20	9	7	63	6	10	60	153
Volcanic Events	1	2	2	3	5	15	1	7	7	8	10	80	104

Cori closed the meeting with a review of the next steps that need to be taken. Continuing the planning process with a focus on public outreach is important, and she will be attending the County Fair with a booth on the Natural Hazard Mitigation Plan update. She is also putting posters up around Arlington and Condon advertising the NHMP survey and hoping to get people to participate.

The next meeting is scheduled for September or October, after harvest and Fair. At the next meeting, the Committee will be discussing mitigation strategies. This will be done through determining the status and progress of 2018 action items, discussing new action items and how to prioritize mitigation action items.

The meeting adjourned at 12:00.



Gilliam County NHMP Update
City of Arlington Jurisdictional Meeting
Tuesday, September 26, 2023

AGENDA

- I. Welcome and Introductions
- II. NHMP Overview
 - a. What, Why and How
 - b. Project Timeline
 - c. Steering Committee Expectations
- III. Community Profile
 - a. Critical Infrastructure and Facilities Review
 - b. County and City Asset Review
 - c. Demographic Information
 - d. Vulnerable Populations
- IV. Goals Update
- V. Hazard Vulnerability Analysis
 - a. Work Session
- VI. Mitigation Action Item Review
 - a. Status of 2018 Items
 - b. New items for 2023/2024
- VII. Next Steps
- VIII. Adjourn



City of Arlington Natural Hazard Mitigation Plan Steering Committee Meeting Minutes
Tuesday, September 26, 2023

Welcome and Introductions began at 10:00 on Tuesday, September 26, 2023

In Attendance:

Kari Hayter, Recorder, City of Arlington

Chris Fitzsimmons, NHMP Coordinator, Gilliam County Emergency Management

Shanna Gronquist, Public Works, City of Arlington

Cori Mikkalo, NHMP Update Coordinator, Fair Winds Consulting, LLC

As part of the introductions, each person noted their familiarity with Natural Hazards Mitigation Plans (NHMPs) and any previous participation in a NHMP update. Neither City of Arlington employee had participated in an NHMP update before.

After introductions, Cori explained what a Natural Mitigation Plan was, why Gilliam County has one and how the updated process will work. She explained that the purpose of an NHMP is to prepare for the long-term effects resulting from natural hazards, and that natural hazard mitigation is a method of reducing or alleviating the losses of life, property and injuries resulting from natural hazards through long and short-term strategies. She explained the Arlington is required to have a jurisdictional addendum in the Gilliam County plan, and that they needed to conduct their own hazard analysis and make sure that the addendum was tailored to the needs of the City.

She explained the essential pieces of an NHMP:

Hazards profile: Description of Local Hazards to help the steering committee make decisions about hazard priority.

Community Profile: Overview of physical, natural, demographic, and social community characteristics, intended to highlight vulnerabilities.

Risk Assessment: Identification of priority risks based on hazard and community information.

Mitigation Strategy: Set of Actions the community prioritizes to respond to risks.

City Addendums: Specific information and mitigation actions for the incorporated cities.

She then explained why Gilliam County was updating their NHMP, because mitigation is important because it is a proactive way to eliminate long-term risk to life and property, and it focuses on preventing emergencies or reducing their effects, increasing a community's ability to



adapt to, withstand and recover from hazards. NHMPs are required by 44 CFR 201 for jurisdictions to be eligible for certain funding for mitigation projects, and they must be updated every 5 years.

Funding that NHMPs make counties eligible include:

Building Resilient Infrastructure and Communities Grants (BRIC): Provides funding to states, local communities, tribes, and territories as they undertake hazard mitigation projects reducing the risks they face from disasters and natural hazards.

Hazard Mitigation Grant Program (HMGP): provides funding to implement long-term hazard mitigation measures after a major disaster declaration.

Flood Mitigation Assistance Program: Property owners who participated in the FMA program must have flood insurance policy on the structure to be mitigated that is current at the time of application and maintained through award.

Emergency Management Performance Grant (EMPG): ODEM requires current NHMP as part of performance measures to receive funds.

Cori then provided an overview of the timeline. The period of performance for this project is April 2023-October 2024. The first steering committee meeting was June 1st, and that today Cori and Chris would be meeting with the City of Arlington and City of Condon. The Second Steering Committee Meeting and a meeting with Lonerock will be scheduled within the next two months.

Cori then let the Steering Committee know what their expectations were, which included providing technical advice and policy direction, identifying hazards that affect Arlington specifically and identifying mitigation activities to reduce the impacts of those hazards. The City of Arlington representatives were also invited and encouraged to attend future County-Wide Steering Committee Meetings.

Community Profile Update

The Steering Committee then reviewed critical infrastructure, critical facilities, vulnerable populations, and new developments in Arlington. They agreed that all identified updates from the June 1st meeting were correct, and they had no additions to critical infrastructure, facilities, vulnerable populations, or new developments.

Basic Arlington Demographic information was reviewed, including 16.4% of the population that is 65 years or older and the median income of \$56,944 (79% of Oregon Median income).

Arlington has a 9.5% poverty rate, and 22.3% of the population is disabled. Gilliam County's



relative social vulnerability according to the CDC was also covered. As of May 2023, the relative social vulnerability index score was 71%.

Goals update:

Cori provided the 2018 NHMP goals, the 2020 State of Oregon NHMP Goals, and the four goals identified by the Steering Committee for 2024. The City of Arlington unanimously agreed with the identified goals and adopted them for the City as well.

Hazard Vulnerability Analysis

Cori then led Arlington through a Hazard Vulnerability Analysis work session. It began with a review of the Gilliam County 2024 identified hazards, and then a comparison to the 2020 State of Oregon NHMP identified hazards. Cori noted that Gilliam County chose to designate extreme weather, which included extreme heat, extreme cold and hailstorms instead of extreme heat for an additional hazard. The City of Arlington agreed that the County identified hazards worked for them as well, and that Arlington suffers from droughts, earthquakes, floods, winter storms (including landslides) volcanoes, wildfires, windstorms, and extreme weather.

They then reviewed the 2018 Oregon Climate Change Research Institute's report on projected changes to Gilliam County weather for the 2020s (2010-2039) and 2050s (2040-2069). Overall climate change models project warmer, drier summers for the region. It is highly likely that Gilliam County will experience increasing wildfire frequency and intensity, increasing extreme heat frequency and severity, as well as an increase in extreme precipitation and extreme river flows. This information was used to help inform the hazard analysis.

Federal and state disaster declaration history was also reviewed, and it was noted that 29 total fires in Oregon from 2018-2023 received Fire Management Assistance FEMA declarations, though none in Gilliam County.

The Steering Committee worked through a hazard analysis for winter storms/landslide, wildfire, drought, windstorm, extreme weather, volcanic event, flood, and earthquake. While working through the hazard analysis they also reviewed climate change predictions to help aid with future probability. Additionally, during this time hazard history tables were reviewed and added on to if necessary. Arlington had nothing to add that the June 1st meeting had not already updated.

The results were compared to the 2018 Hazard analysis. Winter storm and wildfire stayed as the top two highest risks, with winter storm at 238 compared to 222 in 2018, and wildfire at 234, compared to 230 in 2018. Extreme weather was the third highest risk, followed by drought. The largest change is that earthquake went from the third highest risk in 2018 to having the lowest



risk level overall in 2023/24. This is due to a decrease in max threat and vulnerability assessment from the City.

City of Arlington 2023/2024 Hazard Vulnerability Analysis

Hazard	History			Vulnerability			Probability			Maximum Threat			Total Threat Score
	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	
Wildfire	7	2	14	10	5	50	10	7	70	10	10	100	234
Winter Storms/Landslides	9	2	18	10	5	50	10	7	70	10	10	100	238
Drought	4	2	8	8	5	40	7	7	49	10	10	100	197
Extreme Weather	8	2	16	8	5	40	10	7	70	8	10	80	206
Floods	3	2	6	4	5	20	2	7	14	9	10	90	130
Earthquakes	1	2	2	8	5	40	1	7	7	8	10	80	129
Windstorms	8	2	16	4	5	20	8	7	56	7	10	70	163
Volcanic Events	1	2	2	8	5	40	2	7	14	8	10	80	136

The Steering Committee then reviewed the 2018 mitigation action items and noted which ones were in progress and which still needed to be completed. WF#1, reducing wildfire fuel load through weed abatement projects and firebreaks is ongoing. Weed abatement projects took place annually, and fire breaks were installed as staffing allowed. EQ1, source generators for City Hall and Schools had not taken place, but it was noted that the North Gilliam County Rural Fire Protection District Hall had a generator and could be used as a shelter site in an emergency. WS#1, Public outreach to residents regarding sidewalk maintenance during freezing rain events was conducted prior to and during events and will remain ongoing for the city.

The City expressed a desire for continued wildfire fuel abatement and generators for important buildings but did not have any other City specific mitigation actions at that time. The City of Arlington Public works is planning to attend the next County wide Steering Committee Meeting and will bring ideas for Arlington mitigation action items to that meeting.

Cori closed the meeting with a review of the next steps that need to be taken, including upcoming meetings with the City of Condon, Lonerock and the Steering Committee Meeting two all taking place within the next few months.



**Gilliam County NHMP Update
City of Condon Jurisdictional Meeting**

Tuesday, September 26, 2023

AGENDA

- I. Welcome and Introductions
- II. NHMP Overview
 - a. What, Why and How
 - b. Project Timeline
 - c. Steering Committee Expectations
- III. Community Profile
 - a. Critical Infrastructure and Facilities Review
 - b. County and City Asset Review
 - c. Demographic Information
 - d. Vulnerable Populations
- IV. Goals Update
- V. Hazard Vulnerability Analysis
 - a. Work Session
- VI. Mitigation Action Item Review
 - a. Status of 2018 Items
 - b. New items for 2023/2024
- VII. Next Steps
- VIII. Adjourn



City of Condon Natural Hazard Mitigation Plan Steering Committee Meeting Minutes
Tuesday, September 26, 2023

Welcome and Introductions began at 2:00 on Tuesday, September 26, 2023

In Attendance:

Kathryn Greiner, Administrator, City of Condon
Chris Fitzsimmons, NHMP Coordinator, Gilliam County Emergency Management
Gibb Wilkins, Public Works, City of Condon
Cori Mikkalo, NHMP Update Coordinator, Fair Winds Consulting, LLC

As part of the introductions, each person noted their familiarity with Natural Hazards Mitigation Plans (NHMPs) and any previous participation in a NHMP update. City of Condon employees had participated in an NHMP update before.

After introductions, Cori explained what a Natural Mitigation Plan was, why Gilliam County has one and how the updated process will work. She explained that the purpose of an NHMP is to prepare for the long-term effects resulting from natural hazards, and that natural hazard mitigation is a method of reducing or alleviating the losses of life, property and injuries resulting from natural hazards through long and short-term strategies. She explained that Condon is required to have a jurisdictional addendum in the Gilliam County plan, and that they needed to conduct their own hazard analysis and make sure that the addendum was tailored to the needs of the City.

She explained the essential pieces of an NHMP:

Hazards profile: Description of Local Hazards to help the steering committee make decisions about hazard priority.

Community Profile: Overview of physical, natural, demographic, and social community characteristics, intended to highlight vulnerabilities.

Risk Assessment: Identification of priority risks based on hazard and community information.

Mitigation Strategy: Set of Actions the community prioritizes to respond to risks.

City Addendums: Specific information and mitigation actions for the incorporated cities.

She then explained why Gilliam County was updating their NHMP, because mitigation is important because it is a proactive way to eliminate long-term risk to life and property, and it focuses on preventing emergencies or reducing their effects, increasing a community's ability to



adapt to, withstand and recover from hazards. NHMPs are required by 44 CFR 201 for jurisdictions to be eligible for certain funding for mitigation projects, and they must be updated every 5 years.

Funding that NHMPs make counties eligible include:

Building Resilient Infrastructure and Communities Grants (BRIC): Provides funding to states, local communities, tribes, and territories as they undertake hazard mitigation projects reducing the risks they face from disasters and natural hazards.

Hazard Mitigation Grant Program (HMGP): provides funding to implement long-term hazard mitigation measures after a major disaster declaration.

Flood Mitigation Assistance Program: Property owners who participated in the FMA program must have flood insurance policy on the structure to be mitigated that is current at the time of application and maintained through award.

Emergency Management Performance Grant (EMPG): ODEM requires current NHMP as part of performance measures to receive funds.

Cori then provided an overview of the timeline. The period of performance for this project is April 2023-October 2024. The first steering committee meeting was June 1st, and that today Cori and Chris would be meeting with the City of Arlington and City of Condon. A Second Steering Committee Meeting and a meeting with Lonerock will be scheduled within the next two months.

Cori then let the Steering Committee know what their expectations were, which included providing technical advice and policy direction, identifying hazards that affect Condon specifically and identifying mitigation activities to reduce the impacts of those hazards. The City of Condon representatives were also invited and encouraged to attend future County-Wide Steering Committee Meetings.

Community Profile Update

The Steering Committee then reviewed critical infrastructure, critical facilities, vulnerable populations, and new developments in Condon. They agreed that all identified updates from the June 1st meeting were correct, and they had no additions to critical infrastructure, facilities, vulnerable populations, or new developments.

Basic Condon Demographic information was reviewed, including that 49.9% of the population is 65 years or older and the median income is \$35,562 (50% of Oregon Median income). Condon has a 18.2% poverty rate, and 16.2% of the population is disabled. Gilliam County's relative



social vulnerability according to the CDC was also covered. As of May 2023, the relative social vulnerability index score was 71%.

Goals update:

Cori provided the 2018 NHMP goals, the 2020 State of Oregon NHMP Goals, and the four goals identified by the Steering Committee for 2024. The City of Condon unanimously agreed with the identified goals and adopted them for the City as well.

Hazard Vulnerability Analysis

Cori then led Condon through a Hazard Vulnerability Analysis work session. It began with a review of the Gilliam County 2024 identified hazards, and then a comparison to the 2020 State of Oregon NHMP identified hazards. Cori noted that Gilliam County chose to designate extreme weather, which included extreme heat, extreme cold and hailstorms instead of extreme heat for an additional hazard. The City of Condon agreed that the County identified hazards worked for them as well, and that Condon is at risk from droughts, earthquakes, floods, winter storms (including landslides) volcanoes, wildfires, windstorms, and extreme weather.

They then reviewed the 2018 Oregon Climate Change Research Institute's report on projected changes to Gilliam County weather for the 2020s (2010-2039) and 2050s (2040-2069). Overall climate change models project warmer, drier summers for the region. It is highly likely that Gilliam County will experience increasing wildfire frequency and intensity, increasing extreme heat frequency and severity, as well as an increase in extreme precipitation and extreme river flows. This information was used to help inform the hazard analysis.

Federal and state disaster declaration history was also reviewed, and it was noted that 29 total fires in Oregon from 2018-2023 received Fire Management Assistance FEMA declarations, though none in Gilliam County.

The Steering Committee worked through a hazard analysis for winter storms/landslide, wildfire, drought, windstorm, extreme weather, volcanic event, flood and earthquake. While working through the hazard analysis they also reviewed climate change predictions to help aid with future probability. Additionally, during this time hazard history tables were reviewed and added on to if necessary. Condon had nothing to add that the June 1st meeting had not already updated.

The results were compared to the 2018 Hazard analysis. Winter storm stayed as one of the top hazards, with a score of 231 in both 2023 and 2018. The top hazard was the newly identified Extreme Weather, with a score of 233 as it was noted extreme heat and extreme cold are common and can severely impact the most vulnerable. Earthquakes remained in third place,



and drought dropped from second to fifth place. All other changes were negligible, with minor shuffling in low ranked hazards.

City of Condon 2023/2024 Hazard Vulnerability Analysis

Hazard	History			Vulnerability			Probability			Maximum Threat			Total Threat Score
	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	
Extreme Weather	9	2	18	9	5	45	10	7	70	10	10	100	233
Winter Storms/Landslides	8	2	16	9	5	45	10	7	70	10	10	100	231
Earthquakes	1	2	2	3	5	15	5	7	35	5	10	50	152
Windstorms	6	2	12	3	5	15	6	7	42	6	10	60	147
Drought	2	2	4	3	5	15	5	7	35	8	10	80	127
Floods	4	2	8	3	5	15	4	7	28	4	10	40	119
Wildfire	1	2	2	4	5	20	2	7	14	7	10	70	106
Volcanic Events	1	2	2	4	5	20	3	7	21	6	10	60	103

The Steering Committee then reviewed the 2018 mitigation action items and noted which ones were in progress and which still needed to be completed. WS#1, seeking funding for a generator at City Hall was removed. Several other locations in the City have generators and one at City Hall was deemed no longer necessary. WS#2 Conduct public outreach and notification about protecting pipes during extreme cold periods was kept, as this will need to be done every year. WS#3 Seeking funding for more snow removal equipment was in progress, with the City receiving funding for one snowplow and now needing to update their other one. And FL#1, Pursue more recent floodplain information; update floodplain maps was in progress, with an update of the floodplain currently being conducted by FEMA.

The City expressed a desire for continued outreach on natural hazards, generators for other important buildings and seismic retrofits in general but did not have any City specific mitigation actions at that time. The City of Condon Public works is planning to attend the next County wide Steering Committee Meeting and will bring ideas for Condon mitigation action items to that meeting.

Cori closed the meeting with a review of the next steps that need to be taken, including upcoming meetings with the City of Lonerock and Steering Committee Meeting two all taking place within the next few months.

The meeting adjourned at 4:00.



Gilliam County NHMP Update

City of Lonerock Jurisdictional Meeting

Sunday, October 8, 2023

AGENDA

- I. Welcome and Introductions
- II. NHMP Overview
 - a. What, Why and How
 - b. Project Timeline
 - c. Steering Committee Expectations
- III. Community Profile
 - a. Critical Infrastructure and Facilities Review
 - b. County and City Asset Review
 - c. Demographic Information
 - d. Vulnerable Populations
- IV. Goals Update
- V. Hazard Vulnerability Analysis
 - a. Work Session
- VI. Mitigation Action Item Review
 - a. Status of 2018 Items
 - b. New items for 2023/2024
- VII. Next Steps
- VIII. Adjourn



City of Lonerock Natural Hazard Mitigation Plan Steering Committee Meeting Minutes
Sunday, October 8, 2023

Welcome and Introductions began at 6:00PM on Sunday, October 8, 2023

In Attendance:

Stan Forrest, Mayor, City of Lonerock
Andrew Beebe, Citizen, City of Lonerock
Tammy Forrest, Citizen, City of Lonerock
Donna Lopiparo, Citizen, City of Lonerock
Chris Fitzsimmons, NHMP Coordinator, Gilliam County Emergency Management
Cori Mikkalo, NHMP Update Coordinator, Fair Winds Consulting, LLC

As part of the introductions, each person noted their familiarity with Natural Hazards Mitigation Plans (NHMPs) and any previous participation in a NHMP update. Three Lonerock Citizens, including the Mayor have participated in an NHMP update before.

After introductions, Cori explained what a Natural Mitigation Plan was, why Gilliam County has one and how the updated process will work. She explained that the purpose of an NHMP is to prepare for the long-term effects resulting from natural hazards, and that natural hazard mitigation is a method of reducing or alleviating the losses of life, property and injuries resulting from natural hazards through long and short-term strategies. She explained that Lonerock is required to have a jurisdictional addendum in the Gilliam County plan, and that they needed to conduct their own hazard analysis and make sure that the addendum was tailored to the needs of the City.

She explained the essential pieces of an NHMP:

Hazards profile: Description of Local Hazards to help the steering committee make decisions about hazard priority.

Community Profile: Overview of physical, natural, demographic, and social community characteristics, intended to highlight vulnerabilities.

Risk Assessment: Identification of priority risks based on hazard and community information.

Mitigation Strategy: Set of Actions the community prioritizes to respond to risks.

City Addendums: Specific information and mitigation actions for the incorporated cities.

She then explained why Gilliam County was updating their NHMP, because mitigation is important because it is a proactive way to eliminate long-term risk to life and property, and it focuses on preventing emergencies or reducing their effects, increasing a community's ability to



adapt to, withstand and recover from hazards. NHMPs are required by 44 CFR 201 for jurisdictions to be eligible for certain funding for mitigation projects, and they must be updated every 5 years.

Funding that NHMPs make counties eligible include:

Building Resilient Infrastructure and Communities Grants (BRIC): Provides funding to states, local communities, tribes, and territories as they undertake hazard mitigation projects reducing the risks they face from disasters and natural hazards.

Hazard Mitigation Grant Program (HMGP): provides funding to implement long-term hazard mitigation measures after a major disaster declaration.

Flood Mitigation Assistance Program: Property owners who participated in the FMA program must have flood insurance policy on the structure to be mitigated that is current at the time of application and maintained through award.

Emergency Management Performance Grant (EMPG): ODEM requires current NHMP as part of performance measures to receive funds.

Cori then provided an overview of the timeline. The period of performance for this project is April 2023-October 2024. The first steering committee meeting was June 1st, and on September 26th Cori and Chris met with the City of Arlington and City of Condon. A Second Steering Committee Meeting was scheduled for November 6th.

Cori then let the Lonerock Steering Committee know what their expectations were, which included providing technical advice and policy direction, identifying hazards that affect Lonerock specifically and identifying mitigation activities to reduce the impacts of those hazards. The City of Lonerock representatives were also invited and encouraged to attend the second Steering Committee Meeting in November.

Community Profile Update

The Steering Committee then reviewed critical infrastructure, critical facilities, vulnerable populations, and new developments in Lonerock. They agreed that all identified updates from the June 1st meeting were correct, and they had no additions to critical infrastructure, facilities, vulnerable populations, or new developments.

Basic Lonerock Demographic information was reviewed, including that 26.2% of the population is 65 years or older and the median age is 61.3 years. Lonerock has a 25% poverty rate, and 26.1% of the population is disabled. Gilliam County's relative social vulnerability according to the CDC was also covered. As of May 2023, the relative social vulnerability index score was 71%.

Goals update:



Cori provided the 2018 NHMP goals, the 2020 State of Oregon NHMP Goals, and the four goals identified by the Steering Committee for 2024. The City of Lonerock unanimously agreed with the identified goals and adopted them for the City as well.

Hazard Vulnerability Analysis

Cori then led Lonerock through a Hazard Vulnerability Analysis work session. It began with a review of the Gilliam County 2024 identified hazards, and then a comparison to the 2020 State of Oregon NHMP identified hazards. Cori noted that Gilliam County chose to designate extreme weather, which included extreme heat, extreme cold and hailstorms instead of extreme heat for an additional hazard. The City of Lonerock agreed that the County identified hazards worked for them as well, and that Lonerock is at risk from droughts, earthquakes, floods, winter storms (including landslides) volcanoes, wildfires, windstorms, and extreme weather.

They then reviewed the 2018 Oregon Climate Change Research Institute's report on projected changes to Gilliam County weather for the 2020s (2010-2039) and 2050s (2040-2069). Overall climate change models project warmer, drier summers for the region. It is highly likely that Gilliam County will experience increasing wildfire frequency and intensity, increasing extreme heat frequency and severity, as well as an increase in extreme precipitation and extreme river flows. This information was used to help inform the hazard analysis.

Federal and state disaster declaration history was also reviewed, and it was noted that 29 total fires in Oregon from 2018-2023 received Fire Management Assistance FEMA declarations, though none in Gilliam County.

The Steering Committee worked through a hazard analysis for winter storms/landslide, wildfire, drought, windstorm, extreme weather, volcanic event, flood and earthquake. While working through the hazard analysis they also reviewed climate change predictions to help aid with future probability. Additionally, during this time hazard history tables were reviewed and added on to if necessary. Lonerock had nothing to add that the June 1st meeting had not already updated.

The results were compared to the 2018 Hazard analysis. Overall numerical scores increased. Winter storm and wildfire remained the top two hazards, with winter storm scoring 202, compared to 180 in 2018 and wildfire scoring 236, compared to 163 in 2018. Windstorm became the third highest hazard, moving up from fifth in 2018. Volcanic events and drought remained low risk for both 2023 and 2018.

City of Lonerock 2023/2024 Hazard Vulnerability Analysis



Hazard	History			Vulnerability			Probability			Maximum Threat			Total Threat Score
	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	Severity	Weight Factor	Subtotal	
Wildfire	8	2	16	10	5	50	10	7	70	10	10	100	236
Winter Storms/Landslides	6	2	12	4	5	20	10	7	70	10	10	100	202
Windstorms	1	2	2	3	5	15	6	7	42	8	10	80	139
Extreme Weather	2	2	4	3	5	15	5	7	35	7	10	70	124
Earthquakes	2	2	4	5	5	25	2	7	14	8	10	80	123
Drought	1	2	2	2	5	10	1	7	7	10	10	100	119
Floods	7	2	14	2	5	10	8	7	56	2	10	20	100
Volcanic Events	1	2	2	2	5	10	1	7	7	3	10	30	49

The Steering Committee then reviewed the 2018 mitigation action items and noted which ones were in progress and which still needed to be completed. WF #1, weed abatement; decrease wildfire risk through maintenance of yard and roadside vegetation is ongoing, and must be performed annually. FL#1, Maintain and upgrade Lonerock Bridge; remove willows from creek bed and replace current bridge with free standing bridge was completed, and WS#1, Paving the “grade” Lonerock Road, to reduce icy conditions and accidents in the winter was also completed.

The City determined they had one additional mitigation action item for the 2024 update and want to install a generator in their Community Building/City Hall. This building serves as a municipal building and as an evacuation point in the event of natural disaster and can shelter the entire population of Lonerock. A generator would allow for air conditioning in the summer and heat in the winter if power were to go out. Representatives from the City of Lonerock are planning to attend the November 6th Steering Committee Meeting and will bring ideas for additional Lonerock mitigation action items to that meeting.

Cori closed the meeting with a review of the next steps that need to be taken, including the upcoming second Steering Committee Meeting in November and continued work on the plan.

The meeting adjourned at 8:00PM.



Gilliam County NHMP Update Steering Committee Meeting #2

Monday, November 6, 2023

AGENDA

- I. Welcome and Introductions
- II. Purpose of Today’s Meeting
- III. Review of Identified Hazards
- IV. Review and finalization of Mitigation Plan Goals
- V. Mitigation Action Item Work Session
 - a. Review 2018 Mitigation Action Items
 - b. Develop 2023/2024 Mitigation Action Items
- VI. Prioritization
 - a. Modified STAPLEE
- VII. Plan Implementation and Maintenance
- VIII. Next Steps

Gilliam County 2023 Hazard History Table

HAZARD	HISTORY WF = 2	VULNERABILITY WF = 5	MAX THREAT WF = 10	PROBABILITY WF = 7	RISK SCORE
Winter Storms (& Landslide)	2 x 10	5 x 10	10 x 10	7 x 10	240
Wildfire	2 x 10	5 x 10	10 x 10	7 x 10	240
Drought	2 x 10	5 x 8	10 x 10	7 x 10	230
Extreme Weather (heat waves, cold snaps, hail)	2 x 8	5 x 8	10 x 10	7 x 10	226
Flood	2 x 7	5 x 6	10 x 7	7 x 8	170
Earthquake	2 x 2	5 x 4	10 x 10	7 x 6	166
Windstorm	2 x 5	5 x 4	10 x 6	7 x 9	153
Volcanic Event	2 x 1	5 x 3	10 x 8	7 x 1	104

Gilliam County Natural Hazards Mitigation Plan Steering Committee Meeting

Monday, November 6, 2023
Please sign in

Full Signature	Name	Title	Representing	Email
	Chris Fitzsimmons	Coordinator	Gilliam County Emergency Management	Chris.fitz@co.gilliam.or.us
	Chet Wilkins	Assessor	Gilliam County Assessor's Office	Chet.wilkins@co.gilliam.or.us
	Casey Zellars	Coordinator	Gilliam County Fire Services	gcf@ortelco.net
	Cori Mikkalo	NHMP Coordinator	Fair Winds Consulting, LLC, Gilliam County	Cori.mikkalo@fairwindsemrgencymanagement.com
	Dailene Wilson		Gilliam County Public Health	dailene@gilliamcountypublichealth.org
	Dewey Kennedy	Road Master	Gilliam County Road Department	Dewey.kennedy@co.gilliam.or.us
	Gary Bettencourt	Sheriff	Gilliam County Sheriff's Office	gary.bettencourt@co.gilliam.or.us
	Shanna Gronquist	Public Works	City of Arlington	cityofapw@gorge.net
	Gibb Wilkins	Public Works	City of Condon	publicworks@cityofcondon.com
	Herb Winters	District Manager	Soil & Water Conservation District	Herb.gilliamsacd@gmail.com
	Greg Smith	Chief	South Gilliam Co. Rural Fire Protection District	Greggs3338@gmail.com
	Joe Claughton	Chief	North Gilliam Co. Rural Fire Protection District	jclaught@gmail.com
	Jordan Maley	Extension Agent	OSU	Jordan.maley@oregonstate.edu
	Joely Jaeger	Coordinator	Gilliam County Emergency Management	Joely.jaeger@co.gilliam.or.us



Gilliam County Natural Hazard Mitigation Plan Steering Committee Meeting #2 Minutes
Monday, November 6, 2023

Welcome and Introductions began at 2:00 PM on Monday, November 6, 2023.

In Attendance:

Chris Fitzsimmons, NHMP Coordinator, Gilliam County Emergency Management
Chet Wilkins, Assessor, Gilliam County Assessor's Office
Casey Zellars, Operations Chief, Gilliam County Fire Services
Dewey Kennedy, Road Master, Gilliam County Road Department
Dailene Wilson, Gilliam County Public Health
Gary Bettencourt, Sheriff, Gilliam County Sheriff's Office
Shanna Gronquist, Public Works, City of Arlington
Gibb Wilkins, Public Works, City of Condon
Greg Smith, Chief, South Gilliam County Rural Fire Protection District,
Joe Cloughton, Chief, North Gilliam County Rural Fire Protection District
Joely Jaeger, Coordinator, Gilliam County Emergency Management
Michelle Colby, Planner, Gilliam County Planning Department
Mike Renault, Regional Mobilization Coordinator, Oregon State Fire Marshal
Nore Wright, Office Manager, Soil and Water Conservation District
Rob Fore, Fuels Specialist, Bureau of Land Management
Richard Fletcher, Rangeland Fire Protection Specialist, ODF
Sheldon Rhoden, Fire Management Specialist/Fire Trespass Coordinator, Bureau of Land Management
Cori Mikkalo, NHMP Update Coordinator, Fair Winds Consulting, LLC
Jodan Maley, Agent, OSU Extension
Simone Cordery-Cotter, Fire Risk Reduction Specialist, Oregon State Fire Marshal
Stan Forrest, Mayor, City of Lonerock
Andrew Beebe, Citizen, City of Lonerock

Cori started the meeting by reviewing the agenda and purpose of the meeting. The main purpose of today's meeting was to conduct a mitigation action item work session; review the status of 2018 mitigation actions and develop new mitigation actions for the 2024 plan. Additionally, the Steering Committee will review the prioritization process and plan implementation and maintenance process.

Cori reviewed Gilliam County's identified natural hazards and the hazard analysis matrix that the steering committee had completed at the previous meeting, as well as the individual hazard analysis matrixes that Arlington, Condon and Lonerock had completed for their Cities.



The Steering Committee then reviewed the 2018 actions and shared updates or progress that had occurred.

12 mitigation actions from 2018 are in progress, two were completed, one was removed because it was no longer relevant and three were retained but had not been worked on. The City of Lonerock had their grade paved and their bridge replaced, both important mitigation action items. The Condon Grade School, which was rated with a high probability of collapsing during a seismic event was replaced with a new building that was seismically fit and has hookups for an emergency generator built in.

In 2018 the Steering Committee had intentionally focused on a smaller number of mitigation action items, but in accordance with updated FEMA policy in 2023, they created several new, more detailed mitigation action items. 2018 items such as “seismically retrofit critical facilities” were updated to list out the facilities, including Arlington and Condon Childcare Centers and Clinics.

In this session the steering committee updated and developed a total of twelve multi-hazard mitigation action items, four drought mitigation action items, three earthquake mitigation action items, one flood mitigation action item, three winter storm mitigation action items, eleven wildfire mitigation action items and one extreme weather mitigation action item.

Gilliam County is currently undergoing a FIRM update through FEMA, the most recent flood plain information is from 1984. Gilliam County Emergency Management and Gilliam County Planning are working closely with FEMA to help coordinate this update. New FIRMS will be included in the next NHMP update.

The Steering Committee reviewed the 2018 implementation and maintenance process, as well as the prioritization process contained in the 2018 plan. They agreed that these were the processes they wanted to continue to use.

The Steering Committee then prioritized action items using a modified STAPLEE process. STAPLEE evaluates social, technical, administrative, political, legal, economic, and environmental capabilities and impacts. For Gilliam County’s initial project prioritization, qualitative methods were used to determine priority, including quality of life, natural and beneficial values, including actions that could benefit long term risk including climate change, and which actions would provide the benefit to the largest number of people, specifically focusing on socially vulnerable communities. They plan to use STAPLEE and FEMA Cost Benefit analysis to prioritize mitigation actions annually at Steering Committee Meetings, recognizing that initial priorities may change based on recent hazard events, staffing and funding availability.

The meeting ended with a review of the plan approval process and adjourned at 4:00 PM.

2018 Update Project Background

Project Background

Gilliam County collaborated with the Department of Land Conservation and Development (DLCD), and the University of Oregon’s Institute for Policy Research and Engagement (IPRE) through the Resource Assistance for Rural Environments (RARE) and the Oregon Partnership for Disaster Resilience (OPDR), to update the 2013 Gilliam County NHMP. The Disaster Mitigation Act of 2000 requires communities to update their NHMPs every five years to remain eligible for Hazard Mitigation Assistance (HMA) funds through the Pre-Disaster Mitigation (PDM) program, Flood Mitigation Assistance (FMA) program, and the Hazard Grant Mitigation Program (HMGP). Steering Committee members from Gilliam County and participating Cities met to update their NHMP. Participating Cities are the Cities of Arlington, Condon, and Lonerock. Major changes to the 2013 NHMP are documented and summarized in this appendix.

2018 Plan Update Changes

The sections below only discuss *major* changes made to the 2013 NHMP during the 2018 plan update process. Major changes include the replacement or deletion of large portions of text, changes to the plan’s organization, updated hazard risk and vulnerability assessment, and new mitigation action items. If a section is not mentioned then it can be assumed that no significant changes occurred.

Table B-1 lists the 2013 Gilliam County NHMP plan section names and the corresponding 2018 section names, as updated. This appendix will use the 2018 plan update section names to reference any changes, additions, or deletions within the plan. The changes are described sequentially in the text following Table B-1.

Table B-1 Changes to Plan Organization

2013 Gilliam County NHMP	2018 Gilliam County NHMP
Volume I: Basic Plan	Volume I: Basic Plan
Executive Summary	Executive Summary
Introduction	Introduction
Risk Assessment	Risk Assessment
Mitigation Strategy	Mitigation Strategy
Implementation and Maintenance	Implementation and Maintenance
	Volume II: City Addenda
	City of Arlington Addendum
	City of Condon Addendum
	City of Lonerock Addendum
Volume II: Appendices	Volume III: Appendices
Appendix A: Action Item Forms	Appendix A: Action Item Forms
Appendix B: Planning and Public Process	Appendix B: Planning and Public Process
Appendix C: Community Profile	Appendix C: Community Profile
Appendix D: Economic Analysis of Mitigation Actions	Appendix D: Economic Analysis
Appendix E: Survey Report	Appendix E: Survey Report
Appendix F: Grant Programs	Appendix F: Grant Programs
	Appendix G: Climate Change Influence on Natural Hazards: Overview and Gilliam County Projections

Front Pages

Acknowledgements have been updated to include the 2018 project partners and planning participants.

The FEMA approval letter, review tool, and County and City resolutions of adoption are included.

Volume I: Multi-Jurisdictional Natural Hazards Mitigation Plan

Volume I provides the overall plan framework for the 2018 NHMP update, including the following sections:

Executive Summary

The 2018 NHMP includes an updated plan summary that provides information about the purpose of natural hazards mitigation planning, key points from the NHMP update process, and describes how the plan will be implemented.

Section I: Introduction

Section 1 introduces the concept of natural hazards mitigation planning and answers the question, “Why develop a mitigation plan?” Additionally, Section 1 summarizes the 2018 plan update process, and provides an overview of how the plan is organized.

Section 2: Risk Assessment

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

- Hazard characteristics, probability, and vulnerability information.
- Population vulnerability trends and significant statistics.
- National Flood Insurance Program (NFIP) information.
- The Hazard Vulnerability Analysis tool.

Section 3: Mitigation Strategy

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

Mission and Goals were reviewed and compared with the State NHMP Mission and Goals, changes were made and are described in the meeting notes, included in this section.

The Gilliam County Steering Committee met to review the previous NHMP action items. Steering Committee members provided updates and edits to the mitigation actions where applicable including the revision and consolidation of existing actions, managing department/agency designations, timeframe, and potential funding sources.

A list of prioritized actions for the County and Cities was developed, new actions were based upon current needs based upon the community risk assessment. Current activity for institutionalized mitigation activities was described and is included in Section 3.

Section 4: Plan Implementation and Maintenance

The Natural Hazards Mitigation Steering Committee (NHMSC) informally met several times since the previous version of this NHMP. Progress towards action items is documented in Section 3 (above). The NHMSC agreed to meet semi-annually and the Gilliam County Emergency Management Department will be the convener of these meetings, as well as the entity responsible for coordinating implementation and future updates. The NHMSC will discuss options to integrate the NHMP into other planning documents (including the comprehensive plan) and revisit funding options during their semi-annual meetings.

Volume II: Jurisdictional Addenda

The previous version of the NHMP did not include jurisdictional addenda. Jurisdictional Risk Assessments and Mitigation Actions were incorporated into Section 2 and Section 3. The Cities of Arlington, Condon, and Lonerock participated and formed Steering Committees to inform the Jurisdictional Addenda.

Volume III: Mitigation Resources

Appendix A: Action Item Forms

This appendix details background, implementation steps, benefits, costs, and importance for the high and medium priority actions included in the 2018 NHMP. Action item forms were either updated from the previous plan or developed as part of this plan update.

Appendix B: Planning and Public Process

This planning and public process appendix reflects changes made to the Gilliam County NHMP and documents the 2018 planning and public process.

Appendix C: Community Profile

The community profile has been updated to include more recent data. Information from the State of Oregon NHMP (February 2015) was added.

Appendix D: Economic Analysis

This section was reviewed by the staff at DLCD, OEM, and FEMA for accuracy. Minimal updates were made to this section.

Appendix E: Survey Results

The public outreach survey used and responses collected during the 2018 NHMP update is detailed in this appendix.

Appendix F: Grant Programs

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

Appendix G: Climate Change Influence on Natural Hazards: Overview and Gilliam County Projections

The Oregon Climate Change Research Institute (OCCRI) produced two climate change reports. OCCRI's Future Climate Projections Gilliam River County and the Climate Change Influence on Natural Hazards in Eight Oregon Counties: Overview of County Reports, provide 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. The overview discusses all eight of the counties while the respective individual county reports are specific to each county. OCCRI's research and analysis focuses on how climate change is expected to influence natural hazards.

These reports used funds provided by the two Pre-Disaster Mitigation (PDM) 16 grants that DLCD had been awarded by FEMA.

2013 PLAN UPDATE PROJECT BACKGROUND

In September 2011, Gilliam County partnered with the Oregon Partnership for Disaster Resilience (OPDR) (now referred to as the Institute for Policy, Research and Engagement or IPRE) and Resources Assistance for Rural Environments (RARE) to update the 2008 Gilliam County NHMP. RARE and OPDR met with members of the Gilliam County NHMP Steering Committee in November 2011, February 2012, and May 2012 to update the content within the county’s NHMP. The RARE participant also met with each city (Arlington, Condon, and Lonerock) in April 2012 to update content and conduct a hazard analysis for each city’s jurisdiction. RARE, OPDR, and the Gilliam County NHMP Steering Committee made several changes to the 2008 NHMP, summarized below.

2013 Plan Update Changes

Table B-4 below lists the 2008 plan section names and the corresponding 2013 section names as updated. The 2013 plan update section names are used here to reference any changes, additions, or deletions within the plan.

Table B-4: Changes to Plan Sections

2008 Gilliam County NHMP	2012 Gilliam County NHMP
<p>Volume I: Table of Contents Executive Summary Section 1: Introduction Section 2: Community Sensitivity and Resilience Section 3: Risk Assessment Summary Section 4: Mission, Goals, and Action Items Section 5: Plan Implementation and Maintenance</p> <p>Volume II: Identifying and Assessment of Communities at Risk Map of County Assets Resolutions</p> <p>Volume III: Appendix A: Resource Directory Appendix B: Steering Committee and Public Meetings Appendix C: Household Risk Perception Survey Appendix D: Regional Profile Appendix E: Economic Analysis of Mitigation Actions Appendix F: Existing Plans and Policies Appendix G: Open for Business Training</p>	<p>Volume I: Table of Contents Executive Summary Section 1: Introduction Appendix C: Community Profile Section 2: Risk Assessment Section 3: Goals and Action Items Section 4: Plan Implementation and Maintenance</p> <p>Section 2: Risk Assessment Section 2: Risk Assessment (Text/No Map) Table of Contents</p> <p>Volume II: Appendix A: Action Item Forms Appendix B: Planning and Public Process Appendix D: Economic Analysis Removed. Link provided to on-line resource. Appendix E: Regional Hazard Mitigation Public Opinion Survey Appendix F: Grant Programs Removed</p>

1. Most of Section 1 includes new information that replaces out of date text found in the 2008 NHMP. The new text defines mitigation, gives examples of mitigation strategies, and describes the federal mitigation funding programs for which Gilliam County is eligible to apply.
2. OPDR and the plan update coordinator replaced methodology information with text that summarized the development of the 2008 NHMP and added new text to describe the 2013 plan update process, including plan update meetings, public outreach efforts, and final plan review and adoption processes.

Major changes to Section 2 include the following:

Severe Weather was added to the NHMP as a part of the Winter Storm hazard category. The Steering Committee agreed that it was appropriate to include Severe Weather because many of the federal disasters declared for the county have been severe weather related. Landslide/Debris Flow was removed as a separate hazard from the 2008 NHMP, but instead was included as a part of the Severe Weather/Winter Storm hazard category. The Steering Committee determined that landslides are generally secondary hazards, therefore should not be categorized as a separate hazard altogether. Most landslides/debris flows that occur in Gilliam County are secondary hazards caused by severe weather related incidents. The NHMP Steering Committee updated in the Hazard Analysis for Gilliam County using the Oregon Emergency Management Hazard Analysis Methodology. The vulnerability rating for drought increased from moderate to high. The probability and vulnerability for earthquake also increased from low to moderate. In addition, the probability of a flood hazard increased from moderate to high, and the vulnerability increased from low to moderate. The Steering Committee evaluated volcano hazard for the 2013 update and rated the probability of a volcanic event as low and the vulnerability to the hazard as moderate. The county completed a Relative Risk Exercise and used the scores to more accurately define hazard risks in the county, and to supplement previously developed Total Threat Scores.

An overview of Gilliam County hazards was developed that summarizes information about the seven hazards identified by the NHMP Steering Committee.

Community Vulnerability has been added to the section including a listing of community assets and issues that fall under Populations, Economies, Land Use and Development, Critical Infrastructure, and Environment categories.

New to the Risk Assessment section for the 2013 update is individual Risk Assessments for the three incorporated cities in Gilliam County that include: the City of Arlington, City of Condon, and City of Lonerock.

Major changes to Section 3 include the following:

The Gilliam County NHMP Steering Committee reviewed the 2008 plan's goals and modified them with the goals currently identified in Section 3. One goal, Goal 1: Ability to respond effectively and swiftly, was deleted from the plan entirely. Goal 2: Safety of life and property, was modified and Goal 3: Increased cooperation and collaboration between groups and agencies, was determined to still be appropriate for the 2013 update. A new goal was established in the 2013 NHMP update with influence from the State of Oregon's NHMP. The Gilliam County NHMP Steering Committee added State Goal 7: Motivate the public, private sector, and government agencies to mitigate against the effects of natural hazards through information and education, to the Gilliam County NHMP. Several other tables and figures in the section were modified during the plan update.

On May 30, 2012, the Gilliam County NHMP Steering Committee met to review the 2008 NHMP action items. The committee reviewed and identified which of the 2008 NHMP's 24 action items had been completed and whether they should be deleted or deferred. Most of the action items that were deferred were modified in some way to make them more achievable, accurate, or actionable.

Major developments from the Planning Implementation and Maintenance update steering committee meeting involved the following:

- The committee agreed to change the current co-convenor structure to a single convenor, in which the Gilliam County Emergency Management Department is responsible for the NHMP duties listed in the section.

Changes to Volume II: Mitigation Resources include the following:

- Appendix A is new to the Gilliam County NHMP and lists the plan's action items and the current status.
- The community profile consists of new, updated data accessed from the 2010 Census from the U.S. Census Bureau as well as other Federal, State, and Local resources. The entire section has been updated and modified in terms of scope and information, expanding from six pages to 51 pages.
- Appendix E provides a summary report of the survey administered to community stakeholders in the fall of 2011 during the early stages of the Wheeler County NHMP Update. This appendix replaces the 2008 NHMP's tables and summaries from the previous regional survey.

2008 Plan Development Process

In Fall 2005, the Oregon Natural Hazards Workgroup at the University of Oregon's Community Service Center partnered with the Department of Geology and Mineral Industries (DOGAMI) and the Mid-Columbia Gorge Region (Gilliam, Gilliam, Morrow, Sherman, Umatilla, Wasco, and Gilliam) counties to develop a Pre-Disaster Mitigation Planning Grant proposal. FEMA awarded the Mid-Columbia Gorge Region grant to support the development of the natural hazard mitigation plans for the seven counties in the region.

The planning process used to create Gilliam County's Natural Hazards Mitigation Plan was developed using a planning process created by the Community Service Center's Oregon Natural Hazard Workgroup at the University of Oregon. The planning process was designed to: (1) result in a plan that is DMA 2000 compliant; (2) coordinate with the State's plan and activities of the Partners for Disaster Resistance & Resilience; and (3) build a network of jurisdictions and organizations that can play an active role in plan implementation. The planning process included the review and incorporation, if appropriate, of existing plans, studies, reports and technical information. In general, the following regional resources were reviewed and local resources have been cited throughout the plan.

- State of Oregon Natural Hazard Mitigation Plan – Regional Profiles and Hazard Assessments;
- Oregon Technical Resource Guide;
- Oregon Natural Hazards Workgroup Training Manual;
- The Oregon Atlas;
- The Oregon Weather Book;
- Gilliam County Comprehensive Plan;
- Gilliam County Zoning Ordinance;
- North Central Oregon: Strategic Plan for Tourism; and
- Region 5 Household Preparedness Survey Report

Steering Committee

The Gilliam County Steering Committee was comprised of individuals best suited to guide the county through the planning process and ensure that the mitigation plan is fully implemented once adopted.

Its mission was to ensure proper development and implementation of the county natural hazards mitigation plan by:

- setting goals;
- establishing subcommittee work groups to address specific needs;
- ensuring public, private and federal participation;
- distributing and presenting the plan;
- facilitating public discussion/involvement;
- developing implementation activities; and
- coordinating plan maintenance and implementation strategies.

Through raising awareness and citizen involvement, the Committee's end goal was to make hazard mitigation a part of the community's routine decision-making process.

A Steering Committee was developed to assist in developing the plan. The committee included:

- City of Lonerock Mayor, Floyd Parrott
- Gilliam County Sheriff, Gary Bettencourt
- City of Condon Public Works, Larry Duffy
- Gilliam County Appraiser, Dave Messenger
- City of Arlington Public Works, Brian Foster
- Gilliam County Extension Agent, Jordan Malay
- Gilliam County Planning Director, Susie Anderson
- Gilliam County Road Master, Dewey Kennedy
- ODOT Supervisor, Andy Anderson
- Gilliam County Emergency Management Coordinator, Chris Fitzsimmons

As part of the regional PDM grant, ONHW implemented a region wide household preparedness survey. The survey gauged household knowledge of mitigation tools and techniques and assessed household disaster preparedness.

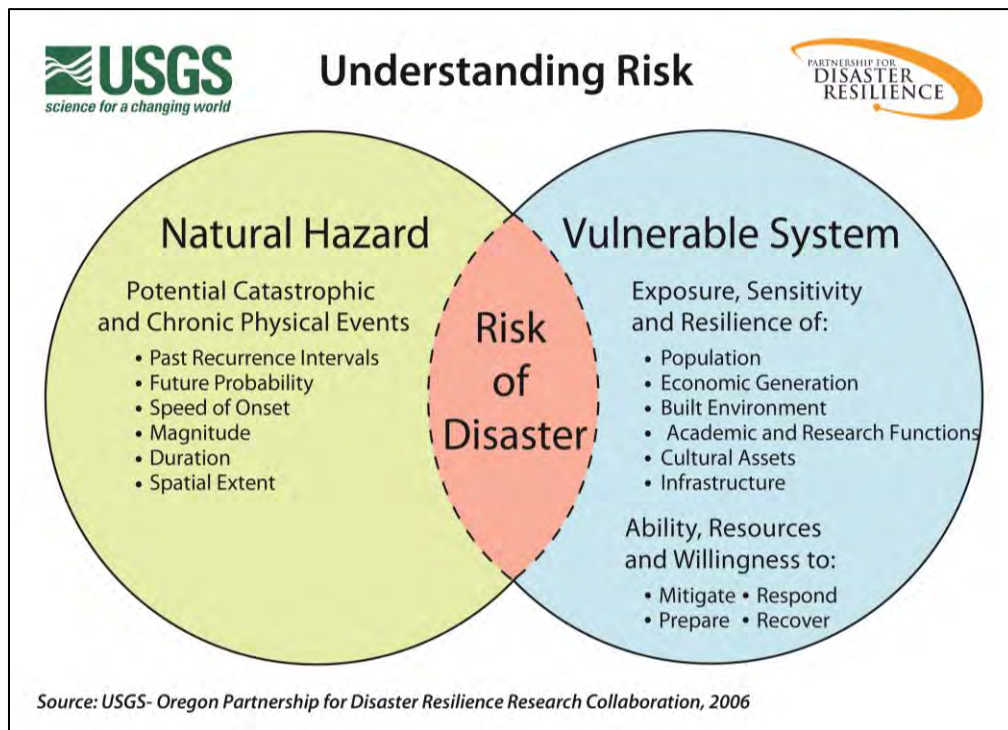
APPENDIX C: COMMUNITY PROFILE

The following section describes Gilliam County from a number of perspectives in order to help define and understand the sensitivity and resilience to natural hazards. Sensitivity and resilience indicators are identified through the examination of community capitals that include natural environment, socio-demographic capacity, regional economy, physical infrastructure, community connectivity, and political capital.

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 by way of the governmental structure, agency missions and directives, as well as through plans, policies, and programs.

The information in this section represents a snapshot in time of the current sensitivity and resilience factors in the County when the plan was developed. The community capitals information below, along with the hazard assessments located in *Section 2: Risk Assessment*, should be used as the local level rationale for the risk reduction action items identified in *Appendix A, Action Item Forms* and *Section 3, Mitigation Strategy*. The identification of actions that reduce Gilliam County's sensitivity and increase its resilience assist in reducing overall risk, which displayed as the area of overlap in Figure C.1 below.

Figure C.1 Understanding Risk



Source: The Institute for Policy Research and Engagement (IPRE), University of Oregon

Why Plan for Natural Hazards in Gilliam County?

Natural hazards impact citizens, property, the environment, and the economy of Gilliam County. Droughts, earthquakes, flooding, extreme weather, volcanoes, wildfires, windstorms, and winter storms have exposed Gilliam County residents and businesses to the financial and emotional costs from impacts and for recovering after natural disasters. The risk associated with natural hazards increases as more people move to areas affected by natural hazards. The inevitability of the occurrence of natural hazards within Gilliam County creates an urgent need to develop strategies, coordinate resources, and increase public awareness to reduce risk and prevent loss from future natural hazard s events. Identifying risks posed by natural hazards and developing strategies to reduce the impact of a hazard event can assist in protecting life and property of citizens and communities. Local residents and businesses should work together with the County to keep the Natural Hazards Mitigation Plan updated. The Natural Hazards Mitigation Plan addresses the potential impacts of hazard events and allows the County to apply for certain funding from FEMA for pre and post disaster mitigation projects that would otherwise not be available if the County did not have an approved Natural Hazards Mitigation Plan.

Natural Environment Capacity

Geography

Gilliam County claims approximately 1,233 square miles of land and water.¹ Elevation ranges from about 250 feet along the Columbia River to about 3,600 feet near the border of the Blue Mountain section.² Located in north central Oregon, Gilliam County lies in the Columbia Plateau, which also known as the Columbia Basin. A majority of the County is a plain that was covered by molten basalt and then uplifted. Topography is mainly the result of erosion and stream cutting in the basalt. The two major waterway systems in the county are the Columbia River, which forms the northern border with the State of Washington, and the John Day River, which forms the western border with neighboring Sherman County. The major drainages to the Columbia River watershed include: Quinton Creek, Blalock Canyon, Alkali Canyon, Eightmile Canyon, Fourmile Canyon, and Willow Creek. In addition, the major drainages to the John Day River watershed in the county include: Rock Creek, Thirtymile Creek, Hay Creek, Ferry Canyon, Lonerock Creek, and Lost Valley Creek.³ Figure C.2 illustrates physiographic provinces throughout the State of Oregon.

¹ Gilliam County Website. <https://co.gilliam.or.us/>

² Gilliam County Website "Communities" <https://co.gilliam.or.us/recreation/communities/index.php>

³ U.S. Department of Agriculture. Oregon Soil Survey Report. "Gilliam County". <https://archive.org/details/usda-soil-survey-of-gilliam-county-oregon-1984>

Figure C.2: Physiographic Provinces in Oregon



Source: Physiographic Provinces, Oregon Habitat Joint Venture - <http://www.ohjv.org/projects.html>

Deschutes-Columbia Plateau

Gilliam County lies mainly within the Columbia Plateau physiographic province. The Deschutes-Columbia Plateau is predominantly a volcanic province covering approximately 63,000 square miles in Oregon, Washington, and Idaho. The plateau 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 Plateau 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.⁴ The three ecoregions of the Columbia Plateau located in Gilliam County include: the Pleistocene Lake Basin, the Deschutes/John Day Canyons, and the Umatilla Plateau. Figure C.3 identifies the three ecoregions encompassed within the county.

⁴ Western Oregon University. Oregon Physiographic Provinces. "Deschutes-Columbia Plateau". 1999. http://www.wou.edu/las/phisci/taylor/eisi/orr_orr2.PDF.

Figure C.3: Ecoregions in Gilliam County



Map Created by Garrett Jensen, Resource Assistance for Rural Environments (RARE)
 Source: Oregon Geospatial Enterprise Office, Spatial Data Library, Ecoregions
 Description: Oregon Natural Heritage Program, 11:250,000

Pleistocene Lake Basins⁵: 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 Plateau with mean annual precipitation varying from seven to 10 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. The City of Arlington is located in this region of the County.

⁵ Environmental Protection Agency. "Ecoregions of Oregon." <https://www.epa.gov/eco-research/ecoregion-download-files-state-region-10#pane-35>.

Umatilla Plateau⁶: 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 15 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. The City of Condon and the City of Lonerock are both located within this region of the County.

Deschutes/John Day Canyons⁷: deeply cut into basalt, the Deschutes/John Day Canyons fragment a lightly populated portion of the Umatilla Plateau. Canyon depths up to 2,000 feet create drier conditions than on the plateau above. In the canyons, bunchgrasses, Wyoming big sagebrush, and cheatgrass grow on rocky, colluvial soil. Riparian vegetation in narrow reaches is often limited to a band of white alder at the water line; broader floodplains and gravel bars are dominated by introduced species, such as reed canarygrass, sweetclover, and teasel. The rivers support Chinook salmon and steelhead runs.

Rivers

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. 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 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.⁸

The Columbia River Basin is the most hydroelectrically developed river system in the world.⁹ 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, and provide flood control, navigation, recreation, fish and wildlife, municipal and industrial water supply, and irrigation benefits.¹⁰

⁶ Environmental Protection Agency. "Ecoregions of Oregon." <https://www.epa.gov/eco-research/ecoregion-download-files-state-region-10#pane-35>.

⁷ Environmental Protection Agency. "Ecoregions of Oregon." <https://www.epa.gov/eco-research/ecoregion-download-files-state-region-10#pane-35>

⁸ Center for Columbia River History. "Columbia River". Written by: Bill Lang Professor of History Portland State University, Former Director, Center for Columbia River History.

⁹ Center for Columbia River History. "Columbia River". Written by: Bill Lang Professor of History Portland State University, Former Director, Center for Columbia River History.

¹⁰ National Oceanic and Atmospheric Administration. Northwest Regional Office. [https://](https://www.fisheries.noaa.gov/west-coast/about-us/west-coast-area-offices)

www.fisheries.noaa.gov/west-coast/about-us/west-coast-area-offices

John Day River¹¹

The John Day River basin drains nearly 8,100 square miles of central and northeast Oregon. It is one of the nations longest free-flowing river systems. Elevations range from 265 feet at the confluence with the Columbia River to over 9,000 feet at the headwaters in the Strawberry Mountain Range. The river has no dams to control water flow; therefore flow levels fluctuate widely in relation to snow pack and rainfall. The John Day River system is under designation of two important river preservation programs; the National Wild and Scenic Rivers Act and the Oregon Scenic Waterways Act. Together, these two acts, one a federal program and one a state program, provide protection for the natural, scenic, and recreational values of river environments.

The Bureau of Land Management (BLM) in partnership with The Confederated Tribes of the Warm Springs, Oregon Department of State Lands, Oregon Parks and Recreation Department, Oregon Department of Fish and Wildlife, and the John Day Coalition of Counties (making up the John Day River Interagency Planning Team) has responsibility for managing the 147-mile John Day Wild and Scenic River from Service Creek in Wheeler County to Tumwater Falls.¹²

John Day Scenic Waterway¹³ which includes:

- The John Day River from its confluence with Parrish Creek downstream to Tumwater Falls;
- The North Fork John Day River from the boundary of the North Fork John Day Wilderness (near river mile 76), as constituted on December 8, 1988, downstream to river mile 20.2 (northern boundary of the south one-half of Section 20, Township 8 South, Range 28 East, Willamette Meridian)
- The Middle Fork John Day River from its confluence with Crawford Creek (near river mile 71) downstream to the confluence of the Middle Fork John Day River with the North Fork John Day River; and
- The South Fork John Day River from the Post-Paulina road crossing (near river mile 35) downstream to the northern boundary of the Murderer's Creek Wildlife Area, as constituted on December 8, 1988 (near river mile 6).

¹¹ U.S. Department of Interior. Bureau of Land Management. "John Day River" <https://www.blm.gov/programs/recreation/permits-and-passes/lotteries-and-permit-systems/oregon-washington/john-day-river>.

¹² U.S. Department of Interior. Bureau of Land Management. "John Day River" <https://www.blm.gov/programs/recreation/permits-and-passes/lotteries-and-permit-systems/oregon-washington/john-day-river>.

¹³ U.S. Department of Interior. Bureau of Land Management. "John Day River" <https://www.blm.gov/programs/recreation/permits-and-passes/lotteries-and-permit-systems/oregon-washington/john-day-river>.

Climate

Temperature, Precipitation and Snowfall

Situated on the east side of the Cascade Mountains, Gilliam County features a hybrid climate and has four distinct seasons and low annual precipitation. The Columbia Gorge serves as a natural channel for normal eastward migration for air masses from the Pacific.¹⁴ These air masses tend to modify extreme temperatures during both the summer and winter seasons. As a result, rarely do abnormally hot or abnormally cool spells persist for more than a few days at a time. Extremely cold conditions can be felt throughout Gilliam County during the winter months when a large easterly flow of air brings in cold continental air.¹⁵ The coldest months are generally January and December when the average winter temperature (°F) ranges from the low 20s in Condon to the low 30s in Arlington. July and August are generally the warmest months with the average temperatures (°F) ranging between the lows 80s in Condon and low 90s in Arlington. Extreme temperatures (°F) historically have reached 100 to 115 throughout the county.¹⁶

Strong marine influences also reflect the occurrence of precipitation, most of which occurs from winter storms during the winter months from November through February. The precipitation is in the form of rain in the lower elevations and snow in the higher ridges and peaks. Heavy showers can be found in the summer months from thunderstorms. Arlington, which sits in the Columbia Gorge and therefore is susceptible to high winds, receives approximately nine inches of annual precipitation, while Condon receives over 14 inches per year. The majority of summer winds come from the west, while winter winds can come from either the west or east and can be strong enough to cause damage.

During the winter season, Condon receives an average of 27.0 inches of snow while snowfall totals in Arlington averages 5.4 inches annually. Table C.1 highlights the monthly averages and extremes for temperatures in the City of Condon according to the National Weather Service. Table C.2 highlights the monthly averages and extremes for temperatures in the City of Arlington according to the National Weather Service.

¹⁴ Sandy Macnab, Sherman County Extension, Oregon State University. http://www.sherman-county.com/about_sherman_county.asp#climate.

¹⁵ Gilliam County Natural Hazard Mitigation Plan. April 2007. Page 2-1.

¹⁶ National Weather Service, NOAA Online Weather Data, Monthly Tabular Data, 1981-2023 <https://w1.weather.gov/climate/xmacis.php?wfo=ptd>

Table C.1: Monthly Averages and Extremes, Condon, Oregon, 1981-2023

Month	Maximum Temperature (deg F)	Minimum Temperature (deg F)	Precipitation (inches)	Snowfall (inches)
January	39.4	25.0	1.6	6.4
February	43.3	26.3	1.3	5.0
March	51.4	30.6	1.28	2.1
April	57.5	33.8	1.37	0.8
May	65.7	40.1	1.57	0.0
June	73.1	45.7	1.09	0.0
July	83.1	51.2	0.42	0.0
August	82.6	51.0	0.42	0.0
September	73.5	44.4	0.59	0.0
October	60.8	36.2	1.08	0.4
November	46.9	29.7	1.60	2.7
December	37.7	23.2	1.80	8.2
Annual	59.4	36.4	14.81	27.0

Source: NOAA Online Weather Data, Monthly Tabular Data, 1981-2023

Table C.2: Monthly Averages and Extremes, Arlington, Oregon, 1981-2023

Month	Maximum Temperature (deg F)	Minimum Temperature (deg F)	Precipitation (inches)	Snowfall (inches)
January	42.3	31.0	1.33	1.4
February	47.1	31.1	0.95	1.5
March	56.7	36.2	0.86	0.1
April	64.9	41.9	0.65	0.0
May	74.1	49.9	0.76	0.0
June	81.5	56.6	0.46	0.0
July	90.6	62.9	0.09	0.0
August	90.2	61.9	0.17	0.0
September	80.3	52.7	0.39	0.0
October	65.8	42.5	0.75	0.1
November	50.5	35.5	1.17	0.4
December	40.5	29.2	1.61	1.9
Annual	65.2	44.7	9.26	5.4

Source: NOAA Online Weather Data, Monthly Tabular Data, 1981-2023

Land Cover

In Gilliam County, about 92-percent (718,256 acres) of the land is privately owned, nearly six-percent (45,000 acres) is owned by Bureau of Land Management (BLM) and just over one-percent (11,391 acres) is owned by the Army Corps of Engineers.¹⁷ Table C.3 describes the land ownership throughout Gilliam County. Most of the land owned by BLM is adjacent to the John Day River and the tributaries, and a majority of the private land in the county is agricultural land, pasture and grasslands, or rangeland.

¹⁷ A Profile of Wildfire Risk, Gilliam County, May 16, 2023, <https://wildfirerisk.org/explore/overview/41/41021/>

Table C.3: Land Ownership in Gilliam County

Land Owner	Number of Acres	Percent of County
Private	718,256	91.8%
Port of Arlington	173	<0.1%
Gilliam County	133	<0.1%
State of Oregon	4,050	0.5%
Bureau of Land Management	56,672	7.2%
Bonneville Power Administration	82	<0.1%
Army Corps of Engineers	11,391	1.2%
Confederated Tribes of Warm Springs	4,630	0.5%
Other	34	<0.1%
Total:	782,615	100.0%

Source: A Profile of Wildfire Risk, Gilliam County, www.wildfirerisk.org

Synthesis

This natural environment capacity section is composed of elements known as natural capital. Natural capital is essential in sustaining all forms of life including human life and plays an often under represented role in community resiliency to natural hazards. With four distinct mild seasons, a diverse terrain and the county's proximity to the Columbia Gorge, Gilliam County historically has dealt with widespread heavy rain and thunderstorm events followed by flash flooding, as well as seasonal brushfires. By identifying these natural capitals such as key river systems, as well as temperature and precipitation patterns, Gilliam County can recognize key hazard areas to better prepare, mitigate, and increase the resiliency of each community.

Socio Demographic Capacity

Population

According to Portland State University’s Population Research Center, the population of Gilliam County in 2020 totaled 1,995 and averaged 1.6 persons per square mile.¹⁸ While the population in the State of Oregon is growing at an average annual rate of 1.1%, Gilliam County population is barely increasing, with a growth rate of 0.66%. The rural county is currently the third least populated in the State of Oregon. The population in 2020 was slightly larger than neighboring Sherman County and Wheeler County, both of which experienced similar small increases in population since 2010. Table C.4 describes the population change in Gilliam County and the adjacent counties.

Table C.4: Population Changes, 2010-2020

County	Population (2020)	Population (2010)	Population Change (2010 - 2020)	Percent Change (2010 - 2020)	Average Annual Growth Rate
Gilliam County	1,995	1,871	124	6.6%	0.66%
Morrow County	11,173	12,186	1,013	9.1%	0.91%
Sherman County	1,870	1,765	105	5.9%	.59%
Wasco County	26,670	25,213	1,457	5.8%	0.58
Wheeler County	1,451	1,441	10	0.7%	0.07%
Oregon	4,240,137	3,421,399	818,738	23.9%	1.1%

Source: Portland State University Population Research Center

Arlington, Condon, and Lonerock are three incorporated cities in Gilliam County, all of which are classified as “rural.” To be considered an urban area, the territory identified according to criteria must encompass at least 5,000 people, at least 1,500 of which reside outside institutional group quarters.¹⁹ The Census Bureau identifies two types of urban areas: Urbanized Areas (UAs) of 50,000 or more people and Urban Clusters (UCs) of at least 2,500 and less than 50,000 people. “Rural” encompasses all population, housing, and territory not included within an urban area. All three cities each have total populations of less than 5,00 people and are considered “rural.” In fact, the entire county has a population lower than 5,000.

Roughly 680 people live in unincorporated areas of the County, about equal to the populations of Arlington and Condon. These unincorporated communities include Blalock, Clem, Mayville, Mikkalo, Olex, Rock Creek, and Thirtymile, which are dispersed throughout the County. As seen in Table C.5, unincorporated areas are experiencing more growth than incorporated areas of the County.

¹⁸ Population Estimates and Reports, Portland State University Population Research Center, <https://www.pdx.edu/population-research/population-estimate-reports> July 2020

¹⁹ U.S. Census Bureau. “2020 Census Urban-Rural Classification Fact Sheet.” December 29, 2022 <https://www.census.gov/library/fact-sheets/2022/dec/2020-census-urban-rural-classification.html>

Table C.5 below describes the population change since 2010 within each city and the unincorporated County areas. Arlington, which is located along the Columbia River and Interstate Highway 84 in the northern part of the County, saw the largest increase. The population in Condon, the county seat, increased as well, and Lonerock increased by 25% by adding 5 more people. Overall, 68% of the County’s population resides in the three incorporated cities.

Table C.5: Population Changes, 2010-2020

Incorporated City	Population (2010)	Population (2020)	Population Change (2010 - 2020)	Percent Change (2010 - 2020)	Average Annual Growth Rate
Gilliam County	1,871	1,995	124	6.6%	0.66%
Arlington	586	628	42	7.2%	0.72%
Condon	682	711	29	4.3%	0.43%
Lonerock	21	25	5	25%	2.5%
Unincorporated Gilliam County	582	631	98	8.4%	.84%

Source: Population Estimates, Portland State University Population Research Center, Cities 2020

Table C.6 displays predicted growth trends over the next several decades in Gilliam County. Most of the expected population growth for the County will occur in Arlington, which is already the most densely populated UGB area within Gilliam County. For more information on expected trends, including changes in age, race, and household composition, see the Coordinated Population Forecast for Gilliam County report from the Portland State University Population Research Center.

Table C.6 Gilliam County Population Growth Forecast

Area/Year	2030	2040	2050	2060
Gilliam County	1,763	1,761	1,757	1,754
Arlington UGB	710	752	797	847
Condon UGB	614	609	599	592
Lonerock UGB	16	16	15	14
Outside UGB Area	422	384	347	300

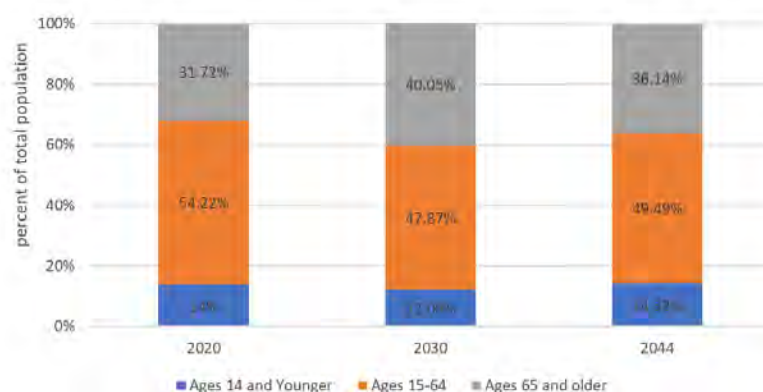
Source: Population Forecasts, Population Research Center, Portland State University.

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

Age

The age profile of an area has a direct impact both on what actions are prioritized for mitigation and how response to hazard incidents is carried out. Figure C.4 illustrates the past and projected percentage of population by age groups within the County. Currently, the US Census Bureau estimates 31.72% of the population in the County is over the age of 65, which is significantly higher compared to only 19.2% of the population in the entire state. In addition, Portland State University's Population Research Center projects that the percent of the County's population under the age of 14 and over the age of 65 will increase over the next decade. The elderly population is anticipated to reach 40.05% of the County population by 2030, and 36.14% by 2044. These numbers suggest that the County may want to consider focusing on hazard mitigation and preparedness actions that are feasible for elderly populations and provide support to this segment of the population to implement these actions.

Figure C.4: Gilliam County Percent of Population by Age, 2020, 2030, 2044



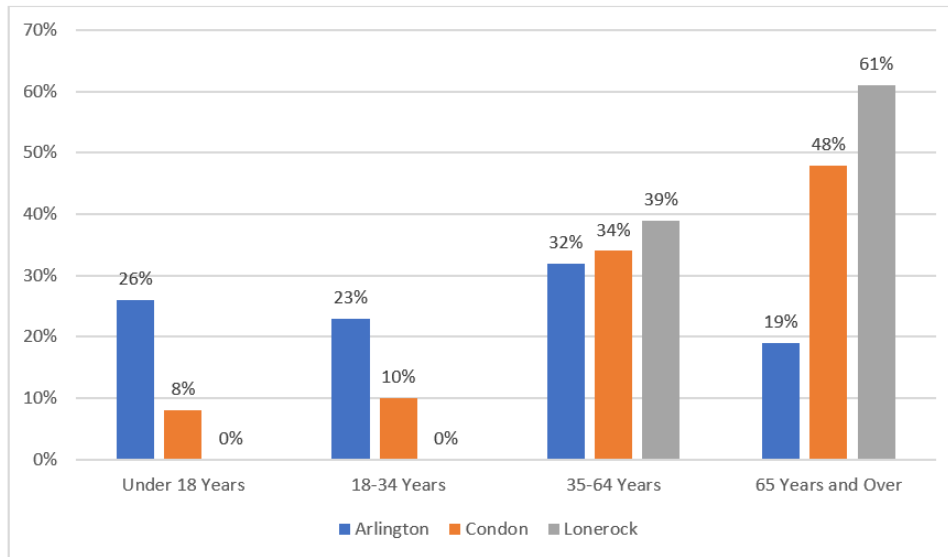
Source: University of Portland Population Research Center, Population Forecasts

Age ranges also vary among the cities within the County. Figure C.5 illustrates the percentage of population by various age groups in each city within the County. The City of Arlington has a much higher percentage of residents under the age of 18 and a lower percentage of residents over the age of 65 compared to the Cities of Condon and Lonerock. In fact, 26-percent of the population in Arlington is under the age of 18, whereas more than 48-percent of the residents in both Condon and Lonerock are over the age of 65. School age children rarely make decisions about emergency management. Therefore, a larger youth population in an area will increase the importance of outreach to schools and parents on effective ways to teach children about fire safety, earthquake response, and evacuation plans. Children are also more vulnerable to the heat and cold, have few transportation options and require assistance to access medical facilities.²⁰ Furthermore, older populations may also have special needs prior to, during and after a natural disaster. The elderly population may require special consideration due to increased sensitivities to heat and cold, possible reliance upon transportation for medications, and comparative difficulty in making home modifications that reduce risk to hazards. Older populations may also require

²⁰ State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile.

assistance in evacuation due to limited mobility or health issues and can lack the social and economic resources needed for post-disaster recovery.²¹

Figure C.5: Percent of Population by Age in Incorporated Cities, 2022



Source: ACS 2022 (5-Year Estimates), Social Explorer Tables S101; U.S. Census Bureau

Other high risk populations include households where persons age 65 or older who live alone as well as single parent households with children under 18. Table C.6 describes the high risk populations in each jurisdiction within the County. In fact, over a third of the households in the City of Condon and the City of Lonerock are occupied by individuals 65 or older who live alone. Additionally, 4.5% of the households in the County are occupied by single parents with children under the age of 18 with the highest percent (12.8%) located in the City of Arlington. These populations will likely require additional support during a disaster and could result in strains on the system if strategies to mitigate these population vulnerabilities are not implemented.

Table C.6: High Risk Households in Gilliam County

Household Type	Gilliam County	Arlington	Condon	Lonerock
Households with individuals under 18	161 [18.7%]	63 [27.4%]	35 [9.3%]	0 [0%]
Single householder with own children under 18	39 [4.5%]	28 [12.8%]	5 [1.3%]	0 [0%]
Householder 65 years and over living alone	207 [24%]	28 [12.2%]	140 [36.8%]	4 [33.3%]

Source: ACS 2022 (5-Year Estimates), Social Explorer Tables S1101; U.S. Census Bureau

²¹ Wood, Nathan. Variations in City Exposure and Sensitivity to Tsunami Hazards in Oregon. U.S. Geological Survey, Reston, VA 2007.

Race

The impact following a disaster in terms of losses and the ability of the community to recover may also vary among minority population groups. 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. Table C.7 describes the population in Gilliam County by race and ethnicity.

Table C.7: Race and Ethnicity in Gilliam County

Race	Count	Percent
Total Population	1,995	
One Race	1,797	90.08%
White	1,747	87.57%
Black or African American	3	0.15%
American Indian or Alaska Native	29	1.45%
Asian	6	0.30%
Native Hawaiian and other Pacific Islander	9	0.45%
Other race	3	0.15%
Two or more races	91	4.56%

Hispanic or Latino Origin	Count	Percent
Total Population	1,995	
Hispanic or Latino (of any race)	107	5.36%
Not Hispanic or Latino	1,888	94.64%

Source: 2020 Decennial (5-Year Estimates), Social Explorer Tables P9; U.S. Census Bureau

The U.S. Census reports that 87% of people in the county identify as white alone. Just less than 6% of the population identifies as Hispanic or Latino. It is important to identify specific ways to support all segments of the community through hazard preparedness and response. Connecting to historically disenfranchised populations through trusted sources or providing preparedness handouts and presentations in the languages spoken by the population can increase community resilience.

Education

Educational attainment of community residents is also an influencing factor in socio demographic capacity. Table C.8 describes the education attainment throughout the county. Compared to the state, Gilliam County has roughly the same percentage of high school graduates, but almost half the percentage of college graduates with a Bachelor's degree or higher (14% less).

Education can influence the ability to access resources, while lack of resources may constrain the ability to understand warning information. Therefore, levels of education

within the region should be considered when designing hazard outreach materials to local communities.²²

Table C.8: Education Attainment

Gilliam County	Count	Percent
Population 25 and over	1,477	
High school graduate or higher	1,327	90%
Bachelor's degree or higher	324	22%

Oregon	Count	Percent
Population 25 and over	3,043,930	
High school graduate or higher	2,789,334	92%
Bachelor's degree or higher	1,106,239	36%

Source: ACS 2022 (1-Year Estimates) Social Explorer Table S1501; U.S. Census Bureau

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 both have negative effects on the resiliency of the community.

Income

Household income and poverty status levels 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 residents in the area.²³ Table C.9 shows the median household incomes in Gilliam County and the surrounding communities. In 2021 the median household income across Gilliam County equaled \$51,705; this is significantly lower in comparison to the state's level. County median income has increased from 2016 to 2021.

Table C.9: Median Household Income, 2021

Median Household Incomes in Region 5	
Oregon	\$75,657
Gilliam	\$51,705
Wheeler	\$46,648
Morrow	\$63,411
Sherman	\$53,606
Umatilla	\$63,123
Wasco	\$57,853

Source: ACS 2021 (5-year estimates) Social Explorer Table S1901; U.S. Census Bureau

²² State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile.

²³ State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile.

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. Low-income populations may require additional assistance following a disaster because they may not have the savings to withstand economic setbacks, and if work is interrupted, housing, food, and necessities become a greater burden. As seen in Table C.9, Gilliam County has the second lowest median household income of the surrounding region. Additionally, low-income households are more reliant upon public transportation, public food assistance, public housing, and other public programs, all which can be impacted in the event of a natural disaster. Table C.10 identifies both the number and the percentage of individuals living below the poverty level. In 2022, the poverty guideline for a family of four equaled income levels at or below \$27,750.²⁴ Poverty limits the ability of households to engage in household level mitigation activities. In addition, the higher the poverty rate, the increased assistance the community will likely need in the event of a disaster in the form of sheltering, medical assistance and transportation. Notably, the poverty estimates as a percentage are relatively lower in Gilliam County compared to state and national averages.

Table C.10: Estimated Number of Residents Living in Poverty

Count	2016 Poverty All Ages (Estimate)	2021 Poverty All Ages (Estimate)	2016 Poverty Under 18 (Estimate)	2021 Poverty Under 18 (Estimate)
Gilliam County	213	228	19	13

Percent	2016 Percent Poverty All Ages	2021 Percent Poverty All Ages	2016 Percent Poverty Under 18	2021 Percent Poverty Under 18
Gilliam County	11%	11.8%	4%	3.9%
Oregon	16%	12.1%	20%	13.8%
United States	13%	12.6%	23%	16.3%

Source: ACS 2016 (5-Year Estimates) (SE), ACS 2021 (5-Year Estimates), Social Explorer Tables S1701; U.S. Census Bureau

Additionally, the number of school children eligible to receive free or reduced lunch has increased by 10-percent from 2012 to 2020, with a spike in 2018. Almost half of the students in Gilliam County qualify for the lunch program. For comparison, Table C.11 describes the status of Gilliam Counties children in terms of the percent of children eligible to receive free or reduced lunch.

Table C.11: Free or Reduced Lunch Eligibility in Gilliam County

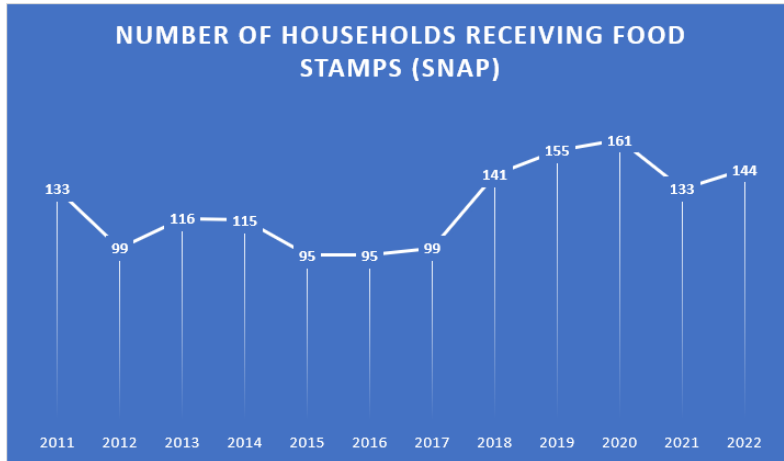
	2012	2014	2016	2018	2020
Percent of children eligible to receive free/reduced lunch during the school year.	32.6%	52.6%	58.9%	60.7%	42.6%

Source: Children First for Oregon, Status of Oregon's Children, 2011-2020

²⁴Federal poverty level, Healthcare.gov, November 23, <https://www.healthcare.gov/glossary/federal-poverty-level-fpl/>

The number of people in the county enrolling in assistance programs has been slowly increasing since 2011. Figure C.7 illustrates the number of households in Gilliam County receiving food stamps. As of 2022 144 households in the county were receiving food stamps; 11 more than in 2021 and 2011, with the highest number of households, 161 receiving food stamps in 2020.²⁵

Figure C.7: Public Assistance in Gilliam County



Source: ACS (2022) 5 Year estimates: Social Explorer Tables: S2201; U.S. Census Bureau

Health Insured

Individual and community health play an integral role in community resiliency. It is recognized that those who lack health insurance have higher vulnerability to hazards and will likely require additional community support and resources. The Census Bureau estimates in 2022 that the number of uninsured residents in Gilliam County equaled 116, roughly 5.9%, which is approximately the same as the state percentage of 6%.²⁶

Synthesis

Socio demographic capacity is a significant indicator of community hazard resiliency. The characteristics and qualities of the community population such as age, race, education, income, health and safety are significant factors that can influence the community’s ability to cope, adapt to and recover from natural disasters. Gilliam County is characterized by a larger elderly population, a small school age population, and a predominately white population. Over 15% of the population has a disability, including half the senior population, which results in a significant group of people with high vulnerability.²⁷ The current status of socio demographic capacity indicators can have long term impacts on the on the economy and stability of the community ultimately affecting future resiliency of the community.

²⁵ACS (2022) 5 Year estimates: Social Explorer Tables: S2201; U.S. Census Bureau

²⁶ ACS 2022 (5-Year Estimates) Social Explorer Table S2701. U.S. Census Bureau

²⁷ ACS 2022 (5-Year Estimates) Social Explorer Table. S1810 U.S. Census Bureau

Regional Economic Capacity

Economic resilience to natural disasters is far more complex than merely restoring employment or income to the local community. Building a resilient economy requires an understanding of how the component parts of employment sectors, workforce, resources, and infrastructure are interconnected in the existing economic picture. Once any inherent strengths or systematic vulnerabilities become apparent, both the public and private sectors can take action to increase the resilience of the local economy.

Regional Affordability

The evaluation of regional affordability supplements the identification of socio-demographic capacity indicators, i.e. economic diversity, and is a critical analysis tool to understanding the economic status of a community. This information can capture the likelihood of individuals' ability to prepare for hazards, through retrofitting homes or purchasing insurance. Regional affordability is a mechanism for generalizing the abilities of community residents to get back on their feet without Federal, State or local assistance.

Economic Diversity

Economic diversity is a general indicator of an area's fitness for weathering difficult financial times. Business activity in Gilliam County and other eastern Oregon counties is fairly homogeneous and consists mostly of basic industries.

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, a diversity ranking of 1 indicates the county with the most diverse economic activity compared to the state as a whole, while a ranking of 36 corresponds with the least diverse county economy. The table below describes the Hachman Index Scores for counties in the region; Gilliam County and neighboring counties are among the least economically diverse in the state.²⁸

Table C.12: Regional Hachman Indexes

County	Hachman Index Score - 2021	Hachman Index Score - 2016	Hachman Index Score - 1999	Percent Change from 2021-1999	State Rank
Sherman	0.046	0.035	0.076	-39.5%	35
Gilliam	0.040	0.050	0.138	-71.0%	36
Wasco	0.388	0.357	0.397	-2.26%	17
Wheeler	0.133	0.149	0.157	-15.3%	30
Clackamas	0.836	0.858	0.802	4.23%	3

Source: Oregon Employment Department

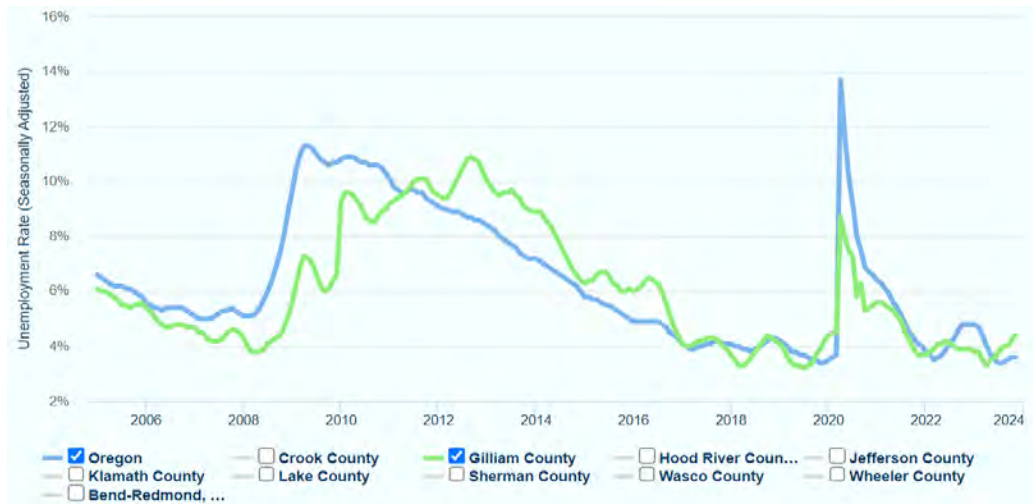
²⁸ Oregon Employment Department. Measuring Local Industry Employment Diversity with the Hachman Index. <https://www.qualityinfo.org/-/measuring-local-industryemployment-diversity-with-the-hachman-index>. July 25, 2022.

While illustrative, economic diversity is not a guarantee of economic vitality or resilience. The economic distress measure is based on indicators of decreasing new jobs, average wages and income, and is associated with an increase of unemployment. According to Business Oregon, Gilliam County was categorized as “non-distressed” in 2023.²⁹

Employment and Wages

According to the Oregon Employment Department, Gilliam County experienced a decline in unemployment from 2013 to 2020 that reflected state trends. In 2020, due to the COVID-19 Pandemic there was a significant jump in unemployment for the county and state.³⁰ Figure C.8 compares the unemployment rate in Gilliam County to that of the state. In addition, Table C.13 describes the annual unemployment changes throughout the region since 2011. Gilliam County and the surrounding region recovered from the 2008 economic decline more slowly than the state as a whole, but now are approximately equal to state numbers.

Figure C.8: Unemployment Rate (Seasonally Adjusted)



Source: Oregon Employment Department, Labor Force Data, Seasonally Adjusted Data 2006-2023

Table C.13: Regional Unemployment (Annual Average)

County	2011	2013	2015	2017	2022
Gilliam County	9.7%	9.5%	6.4%	4.2%	4.0%
Morrow County	8.2%	7.7%	5.7%	4.4%	3.4%
Sherman County	11.1%	9.3%	6.1%	4.8%	3.8%
Wasco County	8.8%	7.6%	5.6%	4.1%	3.7%
Wheeler County	8.5%	6.3%	5.2%	3.9%	3.0%
Oregon	9.5%	7.9%	5.6%	4.1%	4.5%

Source: Oregon Employment Department, Labor Force Data, Seasonally Adjusted Data 2011-2022

²⁹ Distressed Areas in Oregon, 2023; Business Oregon; <https://www.oregon.gov/biz/reports/pages/distressedareas.aspx>

³⁰ Oregon Employment Department, Labor Force Data, Seasonally Adjusted Data 2011-2022; <https://www.qualityinfo.org/east-cascades>

As opposed to measurements of the labor force and total employment, covered employment provides a quarterly count of all employees covered by Unemployment Insurance. Table C.14 displays the covered employment and payroll figures for Gilliam County in 2022.

Table C.14: County Covered Employment (2022)

Employment Sector	2022				Percent Change in Employment (2017-2022)	Regional Employment Forecast (2022-2032)
	Firms	Employees	Percent Workforce	Average Wage		
Total Payroll Employment	148	944	100%	\$58,639	16.4%	9%
Total private coverage	124	714	75.6%	\$62,662	26%	10%
Natural resources and mining*	13	50	5.3%	\$50,940	4%	11%
Agriculture, forestry, fishing & hunting*	13	50	5.3%	\$50,940	4%	11%
Construction	14	N/A	N/A	N/A	N/A	14%
Trade, transportation and utilities	22	127	13.5%	\$57,422	-7%	5%
Financial activities	4	9	1.0%	\$56,334	-44%	3%
Professional and Business services, including Waste Management of Companies and Enterprises	14	238	25.2%	\$74,827	27%	13%
Professional, Scientific and technical services	3	13	1.4%	\$52,096		
Education and health services	4	6	0.6%	\$50,186		
Leisure and hospitality	23	88	9.3%	\$28,143	76%	14%
Other services	10	48	5.1%	\$19,524	0%	11%
Total all government	15	29	3.1%	\$37,490	4%	9%
Total federal government	24	230	24.4%	\$46,151	-7%	7%
Total state government	6	13	1.4%	\$53,269	0%	0%
Total local government	2	5	0.5%	\$55,169	-64%	18%
	15	212	22.5%	\$45,502	-4.5	-1%

Source: Oregon Employment Department, "2022 Covered Employment and Wages Gilliam County, 2022 Annual.

<https://www.qualityinfo.org>. Accessed August 2023

Forecast: "Industry Employment Projections Gilliam, Hood River, Sherman, Wasco and Wheeler Counties." State of Oregon. <https://www.qualityinfo.org/projections#1> Accessed August 15, 2023.

In 2020, there were 70 employment establishments operating in Gilliam County, and 65 (92.9%) percent of those establishments had fewer than 20 employees. 58.6% had between one and four employees.³¹ The prevalence of small businesses in the County is a partial indication of sensitivity to natural hazards, because small businesses are typically more susceptible to financial uncertainty. If a business is financially unstable

³¹ Oregon Employment Department, "2022 Covered Employment and Wages Gilliam County, 2022 Annual.

<https://www.qualityinfo.org>. Accessed August 2023

before a natural disaster occurs, financial losses (resulting from both damage caused and the recovery process) may have a bigger impact than they would for larger and more financially stable businesses.³²

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.³³

This is of specific concern when the businesses belong to the basic sector industry. Basic sector industries are those that are dependent on sales outside of the local community. 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.³⁴

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.³⁵ Thus, understanding and addressing the sensitivities of these industries is a strategic way to increase the resiliency of the entire regional economy. The economy is based mainly on agriculture, with an average farm size of about 4,200 acres. Wheat, barley, and beef cattle are the principal crops. The largest individual employers in the County are two subsidiaries of Waste Management Inc., Chemical Waste Management of the Northwest and Oregon Waste Systems, Inc., which are regional state-of-the-art waste disposal landfills.³⁶

The Union Pacific railroad line and Interstate Highway 84 that both run across the northern part of the County provide good opportunities for the transportation of manufactured and agricultural goods. In addition, the region's proximity to the Columbia River and the high desert terrain provide year-round sporting and tourism activities.

Agriculture

According to 2017 Census of Agriculture by the U.S. Department of Agriculture, 153 farms were located in Gilliam County totaling 611,920 acres of land, down from 170 Farms totaling 723,405 acres in 2012.³⁷ In 2020 Gilliam County ranked fourth in production of

³² State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile

³³ State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile

³⁴ State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile

³⁵ State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile

³⁶ Oregon Blue Book. "Gilliam County." <http://bluebook.state.or.us/local/counties/counties11.htm>. Retrieved 10/12/23

³⁷ U.S. Department of Agriculture Census of Agriculture Gilliam County https://www.nass.usda.gov/Quick_Stats/CDQT/chapter/2/table/1/state/OR/county/021/year/2017/. Retrieved 10/12/23

wheat in the State of Oregon, after Umatilla, Morrow, and Sherman Counties. Gilliam produced 3,629,000 bushels of wheat in 2020 and planted 100,000 acres³⁸

Covered Employment

Table C.15 identifies employment in Gilliam County by industry. As of 2022, the three industries with the most employees included professional and business services (33.3%), government (32.2%) and trade/transportation/utilities (14.9%).³⁹ Notably, the professional and business services industry includes the two subsidiaries of Waste Management Inc. located in the county, Chemical Waste Management of the Northwest and Oregon Waste Systems, Inc., which are regional state-of-the-art waste disposal landfills.⁴⁰

The Oregon Employment Department found a small increase in overall employment in Gilliam County between 2010 and 2022; in 2010 total nonfarm employment was 800 jobs, and in 2022 the county counted 845 jobs. Notably, government still makes up almost a third employment in the County, primarily at the local level. Table C.15 identifies employment changes from 2010 to 2022 in Gilliam County.

Table C.15: Covered Employment Changes, 2010-2022

Industry	Employment 2010	Employment 2022	Percent Change
Total Private Coverage	670	714	6.6%
Natural Resources and Mining	23	50	117.4%
Construction	166	0	
Trade, transportation, utilities	161	127	-23.5%
Professional and business services	142	238	67.6%
Management of Companies	123	13	-89.4%
Education and health services	73	88	-20.5%
Leisure and hospitality	38	48	26.3%
Other services	32	29	-9.4%
Total Government	226	230	1.8%
Total All Ownerships	811	944	16.4%

Source: Oregon Department of Employment, Employment Industry and Wages, 2010, 2022

Labor and Commute Shed

Most natural hazards can happen at any time during the day or night. It may be possible to give advance warning to residents and first responders who can take immediate preparedness and protection measures, but the variability of hazards is one part of why they

³⁸ Oregon Agricultural Statistics & Directory, Oregon Department of Agriculture; <https://www.oregon.gov/oda/shared/Documents/Publications/Administration/AgStatsDirectory.pdf>

³⁹ ACS 2016 (5-Year Estimates) (SE), ACS 2016 (5-Year Estimates), Social Explorer T49; U.S. Census Bureau

⁴⁰ Oregon Blue Book. "Gilliam County". History and general information.

can have such varied impact. A snow storm during the work day will have different impacts than one that comes during the night. During the day, a hazard has the potential to segregate the population by age or type of employment (e.g., school children at school, office workers in downtown areas). This may complicate some aspects of initial response such as transportation or the identification of wounded or missing. Conversely, a hazard at midnight may occur when most people are asleep and unable to receive an advance warning through typical communication channels. The following labor shed and commute shed analysis is intended to document where County residents work and where people who work in Gilliam County reside.

As shown in Table C.16 below, overall the workforce is somewhat mobile between Morrow, Wasco and Umatilla Counties. While 23.6% of Gilliam employees live in the County, there are also a significant number of workers who commute to locations outside the county to work. Overall, 76.4% of workers who live in Gilliam County work in other counties. 69.3% of Gilliam County employees live outside of the County. It is possible that these workers do not physically commute every day or on a regular basis and instead telecommute or otherwise have remote locations.

Table C.17 below tells the statistical story about where workers live who are employed in Gilliam County. The location outside of Gilliam County where the highest numbers of workers commute from is The Dalles (5.5%), followed closely by Morrow County (4.2%). However, a small number of workers also commute from across the border in Washington (1.6%).

In summary, the labor shed analysis and commute shed analysis reveal that there is a great deal of commuting and worker exchange between communities in the region. While 76.4% of Gilliam County residents maintain employment outside of the County, 69.3% of Gilliam County workers reside elsewhere.

Synthesis

Regional economic capacity refers to the present financial resources and revenue generated in the community to achieve a higher quality of life. Forms of economic capital include income equality, housing affordability, economic diversification, employment, and industry. 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.

Considering its moderate poverty rate, and the moderate diversity of its economy (though dependent on several basic industries for revenue generation), Gilliam County may experience a difficult time in recovering from a natural disaster than other communities with a more diverse economic base and higher incomes.⁴¹ In addition, it is important to consider what might happen to the economy if the largest revenue generators and employers (transportation and utilities, as well as professional and business services), were heavily impacted by a disaster. To an extent, and to the benefit of Gilliam County, these particular industries are a mix of basic and non-basic industries, dependent on both external markets and local residents.

⁴¹ State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile.

It is imperative, however, that Gilliam County continues to recognize that economic diversification is a long-term issue. More immediate strategies and actions to reduce vulnerability from an economic perspective should focus on risk management for the County’s dominant industries (e.g. business continuity planning) as well as the dependence on main transportation arteries.

Table C.16*: Work Destination Report, 2021: Where Workers are Employed Who Live in Gilliam County

Location	Number	Percent
Gilliam County	196	23.6%
Condon	107	12.9%
Lonerock	39	4.7%
Arlington	50	6.0%
Morrow County	30	3.6%
Boardman	15	1.8%
Heppner	15	1.8%
Multnomah County		
Portland	58	7.0%
Umatilla County		
Hermiston	18	2.2%
Deschutes County		
Bend	16	1.9%
Wheeler County		
Fossil	19	2.3%
Wasco County		
The Dalles	15	1.8%
All Other Locations	475	57.4%
Total Primary Jobs	827	100.0%

Source*: U.S. Census Bureau, Center for Economic Studies, On the Map, 2021 Work Destination Analysis

Table C.17^: Home Destination Report, 2021: Where Workers Live Who are Employed in Gilliam County

Location	Number	Percent
Gilliam County	251	30.7%
Arlington	126	15.6%
Condon	122	15.1%
Umatilla County	30	3.7%
Pendleton	18	2.2%
Hermiston	12	1.5%
Morrow County	34	4.2%
Boardman	27	3.3%
Heppner	7	0.9%
Multnomah County	17	2.1%
Portland	9	1.1%
Gresham	8	1.0%
The Dalles	44	5.5%
Goldendale, WA	13	1.6%
All Other Locations	421	52.2%
Total Primary Jobs	807	100.0%

Source^: U.S. Census Bureau, Center for Economic Studies, On the Map, 2021 Home Destination Analysis

Built Capacity

Housing Building Stock

Housing characteristics are an important factor in natural hazard mitigation planning, as some housing types tend to be less disaster resistant than others, and therefore warrant special attention. Table C.18 identifies the type of housing structures most common throughout Gilliam County. The vast majority of housing structures in Gilliam County are single family homes, which account for 80% of the housing units. Of particular interest are the number of mobile homes and other non-permanent housing structures, which account for nearly 15% of the housing structures in the county. Mobile structures are particularly vulnerable to certain natural hazards, in particular windstorms, and special attention should be given to securing the structures as they are typically more prone to damage than wood-frame construction.⁴² Also, it is 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 multi-unit structure will have an amplified impact on the population. In Gilliam County, 3% of the housing units have two or more units.

Table C.18: Housing Type Summary

	Number	Percent
1 unit	86	79.6%
2 to 4 units	16	1.5%
5 to 9 units	3	0.5%
10 to 19 units	8	0.8%
20 or more units	17	0.3%
Mobile home	159	14.7%
Boat, RV, van, etc.	4	0.4%
Total housing units	1,081	100.0%

Source: ACS 2022 (5-Year Estimates), Social Explorer DP04; U.S. Census Bureau

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 understanding of plate tectonics and earthquake risk. In 1974 a statewide Unified Building Code was adopted as a means to bring the building criteria for every city and county under one all-inclusive code.⁴³ Under this code, the first provisions for seismic design criteria were implemented. Since the first adoption in 1974, there have been ten revisions to the code to enhance and improve the safety of building and the citizens who occupy them. In fact, according to the State of Oregon Building Codes Division, structural safety has increased more than 225-percent based on the minimum

⁴² State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile.

⁴³ State of Oregon Building Codes Division. Earthquake Design History. A Summary of Requirements in the State of Oregon. February 7, 2012. <https://www.oregon.gov/bcd/codes-stand/Documents/inform-2012-oregon-seismic-codes-history.pdf>

loading criteria base-shear factors since code were first adopted in 1974.⁴⁴ Additionally, manufactured homes installed prior to 2003 lack adequate anchoring and bracing, and are more vulnerable to damage and loss from seismic events.⁴⁴

Thus knowing the age of the structure is helpful in targeting outreach regarding retrofitting and insurance for owners of older structures. Table C.19 describes the age of the housing units throughout the County. According to the U.S. Census Bureau, roughly 69% of the housing units in the County were built prior to 1980; roughly the time when the first seismic codes were implemented statewide. Most Gilliam County homes are manufactured (not site-built).

Table C.19: Housing Units, Year Built

Year Built	Number	Percent
Built 2020 or Later	0	0.0%
Built 2010 to 2019	23	2.1%
Built 2000 to 2009	104	9.6%
Built 1990 to 1999	150	13.9%
Built 1980 to 1989	58	5.4%
Built 1970 to 1979	94	8.7%
Built 1960 to 1969	67	6.2%
Built 1950 to 1959	206	19.1%
Built 1940 to 1949	64	5.9%
Built 1939 or Earlier	315	29.1%
Total Housing Units	1,081	100%

Source: ACS 2022 (5-Year Estimates), Social Explorer DP04; U.S. Census Bureau

Mitigation and preparedness planning should also consider type of occupancy when developing outreach projects or educational campaigns. Residents who own their own home are more likely to take steps to reduce the impact of natural hazards through mitigation or insurance methods. Renters may be less invested in physical improvements to the unit; as a result outreach around personal preparedness or renters insurance would benefit this population. As demonstrated in Table C.20 below, approximately 25.4-percent of the housing units in Gilliam County are renter-occupied.

Table C.20: Housing Occupancy Summary

	Number	Percent
Occupied housing units	862	79.7%
Owner-occupied units	643	74.6%
Renter-occupied units	219	25.4%
Vacant housing units	219	20.3%
Rental Vacancy rate	5.2	
Total housing units	1,081	100.0%

Source: ACS 2022 (5-Year Estimates) Social Explorer DP04; U.S. Census Bureau

⁴⁴ State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile.

Physical Infrastructure

Physical infrastructure such as dams, roads, bridges, railways and airports support Gilliam County communities and economies. Critical facilities are facilities that are critical to government response and recovery activities; however the term may also refer to facilities or infrastructure that could cause serious secondary impacts when disrupted. Many things can be counted as critical infrastructure and facilities depending on the social, environmental, economic and physical makeup of the area under consideration. Some examples include: agriculture and food systems, communications facilities, critical manufacturing, emergency services, energy generation and transmission, government facilities, healthcare and public health facilities, information technology transportation systems; and water. 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.

Roads and Bridges

The Gilliam County Road Department maintains 428 miles of road. Of those miles 295 are gravel road and 133 miles of pavement.⁴⁵ The region's major expressway is Interstate Highway 84. The interstate runs east/west through northern Gilliam County and is the main passage for automobiles, trucks, and buses traveling along the Columbia River. Other major highways that service the region include:

- Oregon Route 19 runs north/south and connects Arlington at I-84 with Condon and continues south to Fossil in Wheeler County.
- Oregon Route 74 is located in the northeast corner of the county. The highway begins at the connection with Interstate Highway 84 in Gilliam County and travels southeast about eight miles before crossing into Morrow County.
- Oregon Route 206 by and large runs east/west and connects Condon with Wasco in Sherman County and Heppner in Morrow County.

Daily transportation infrastructure capacity in the Columbia Gorge region is only moderately stressed by maintenance, congestion and oversized loads; however peak loads and congestion can materialize during holiday seasons and 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.⁴⁶

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.⁴⁷ Table C.26 highlights the number of distressed bridges in Gilliam County. There are 16 County bridges, and two have been repaired with multi-plate culverts. The Lonerock Bridge was replaced in 2021.

⁴⁵ Gilliam County Website. Road Department. https://www.co.gilliam.or.us/government/road_department/index.php

⁴⁶ State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile.

⁴⁷ Dewey Kennedy, Gilliam County Road Master. June 14, 2018

The classification of a distressed bridge does not imply the bridge is unsafe; however in the event of seismic activity these bridges are of higher vulnerability to failure.

Table C.21 County and State Bridges in Gilliam County Deficiency Overview

Seismic Vulnerability- Potentially Vulnerable		Other Deficiency -Distressed Bridges		Not Distressed	
2	10.5%	3	15.8%	16	84.2%

Source: Oregon Department of Transportation 2022 Bridge Condition Report

Rail Ways

Railroads are major providers of regional and national cargo trade flows. A Union Pacific Railroad line runs through Gilliam County and is limited to a stretch of tracks that follow I-84 and the Columbia River on the northern border of the County. A short line is operated by The Palouse River & Coulee City Railroad and runs approximately 11.5 miles from Arlington to the Columbia Ridge Landfill and Recycling Center.⁴⁸ 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 for the local communities if hazardous materials are involved.

Airports

There are four airports located in Gilliam County, two are public and two are privately owned. The Arlington Municipal Airport near Arlington has public access and averages 76 aircraft operations a month; mostly for local general aviation.⁴⁹ The state owned Condon State Pauling Field Airport near Condon also has public access and averages 76 aircraft operations a week; mostly for transient general aviation purposes.⁵⁰ Access to these airports faces the potential for closure from a number of natural hazards, including wind and winter storms common to the region.⁵¹

Power Plants

The main source of power production in the County is generated through wind energy and a growing solar industry. There are a total of 790 wind turbines now operating in the county with a total generating capacity of 1,624.3 megawatts of energy. There is one Solar farm, Pachwaywit Fields (FKA Montague Solar) that produces 162 mW on 1,189 acres. Table C.22 identifies the inventory of wind farm projects in Gilliam County. Eleven of these projects are operating and 2 more are proposed. It is important to note that a few of these projects cross jurisdictional boundaries into Morrow County including Willow Creek, Shepherds Flat Central – S. Hulbert and Shepherds Flat South.⁵²

⁴⁸ Oregon Department of Transportation. Oregon Railways.

<http://www.oregon.gov/ODOT/TD/TDATA/gis/docs/statemaps/railroads.pdf?ga=t>.

⁴⁹ AirNav. Arlington Municipal Airport. <http://www.airnav.com/airport/1S8>.

⁵⁰ AirNav. Condon State Pauling Field Airport. <http://www.airnav.com/airport/3S9>.

⁵¹ State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile.

⁵² Chet Wilkins, Gilliam County Assessor. October 10, 2023

Table C.22: Wind Farm Inventory

Project Title	Type	Turbines/Panels	Capacity	Operating Status
Montague Wind Power Facility	Wind	56	201 mW	Operating
PacificCorp Leaning Juniper I	Wind	67	100.5	Operating
Leaning Juniper IIA Wind Power Facility	Wind	43	90.3 mW	Operating
Leaning Juniper IIB Wind Power Facility	Wind	74	111 mW	Operating
Shepherds Flat Central	Wind	116	290 mW	Operating
Shepherds Flat North	Wind	106	265 mW	Operating
Shepherds Flat South	Wind	116	290 mW	Operating
EDPR Arlington Wind Power Project LLC	Wind	49	102.9 mW	Operating
Wheat Field Power Project LLC	Wind	46	96.6mW	Operating
Condon Windpower LLC	Wind	83	50 mW	Operating
Willow Creek Energy	Wind	18	27 mW	Operating
Oregon Trail Wind	Wind/Solar	16		Proposed
Oregon Trail Solar	Wind/Solar			Proposed
Montague Solar Facility	Solar		162mW	Operating
Total		790	1,786.3 mW	

Source: Gilliam County Assessor, Chet Wilkins 10/10/2023. MW = Megawatts

Utility Lifelines

Utility lifelines are the resources that the public relies on daily, (i.e., electricity, fuel and communication lines). If these lines fail or are disrupted, the essential functions of the community can become severely impaired. Utility lifelines closely relate 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 Gilliam County are operated by Pacific Power and Light (PacifiCorp), Bonneville Power Administration and the Wasco Electric Cooperative. These three entities primarily facilitate local energy production and distribution throughout the area.

Pacific Power (PacifiCorp)

PacifiCorp serves 2 million customers in Southern Washington, Oregon, Northern California, Eastern Idaho, Utah and Wyoming, including Gilliam County and other communities in the Columbia Gorge. PacifiCorp has 64,000 miles of distribution line and approximately 17,000 miles of transmission lines.⁵³ PacifiCorp consists of two business units, aggregating up to PacifiCorp:

Pacific Power, which delivers electricity to customers in Oregon, Washington and California, is headquartered in Portland, Oregon. Pacific Power provides services to the City of Arlington in Gilliam County.⁵⁴

Rocky Mountain Power, which delivers electricity to customers in Utah, Wyoming and Idaho, is headquartered in Salt Lake City, Utah.⁵⁵

Columbia Basin Electric Cooperative⁵⁶

Columbia Basin Electric serves over 4,000 members throughout a service area of approximately 3,000 square miles in five counties, including Gilliam County. The Cooperative serves residential, commercial, industrial and irrigation customers throughout the county, including the cities of Condon and Lonerock. The Cooperative has two offices, one of which is located at 402 S. Main Street in Condon.

Wasco Electric Cooperative

The Wasco Electric Cooperative engages in energy transmission and distribution, providing electric service to over 3,000 members with 1,685 miles of lines and ten substations to serve portions of Gilliam, Wasco, Jefferson, Sherman, and Wheeler Counties.⁵⁷

Bonneville Power Administrative⁵⁸

- The Bonneville Power Administrative (BPA) is a federal non-profit agency based in the Pacific Northwest. BPA markets wholesale electrical power from 31 federal hydro projects in the Columbia River Basin, one nonfederal nuclear plant and several other small nonfederal power plants. About 28% of the power used in the Northwest comes from BPA.

⁵³ PacifiCorp. PacifiCorp Facts. <https://www.pacificpower.net/about.html>

⁵⁴ Pacific Power. Northeastern Oregon. <https://www.pacificpower.net/community/service-area.html>

⁵⁵ Pacific Power. Company Facts. <https://www.pacificpower.net/about.html>

⁵⁶ Columbia Basin Electric Co-op, Inc. Introduction. <https://cbec.cc/about-us>

⁵⁷ Wasco Electric Cooperative. About Wasco Electric Cooperative. <https://www.wascoelectric.com/about/>

⁵⁸ Bonneville Power Administration. About Us webpage. <https://www.bpa.gov/about>

- BPA also operates and maintains about three-fourths of the high-voltage transmission (15,238 circuit miles) in the service territory, which includes California, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming. Several of these lines run through Gilliam County.

Natural Gas Transmission

Gas Transmission Northwest Corporation (GTN), which is operated by TransCanada Corporation, transports natural gas to energy markets along 1,377 miles of pipe from the Canada-Idaho border to the Oregon-California border.⁵⁹ A section of this pipeline bisects Gilliam County. The pipeline system is designed to carry 2,900 million cubic feet of natural gas per day.

Landfills and Waste Facilities

Gilliam County is also home to two Waste Management landfills and disposal facilities, both located on Cedar Springs Lane approximately eight miles south of Arlington.

Columbia Ridge Recycling and Landfill⁶⁰

The facility receives nonhazardous solid wastes from a variety of sources throughout the northwest, including Portland, Oregon and Seattle, Washington. Solid wastes are delivered by waste collection vehicles, transfer vehicles and rail cars (gondolas). The facility operates a transfer station, where the waste is sent to this facility (nonhazardous landfill) or the adjoining Chemical Waste Management or the Northwest facility (hazardous landfill and treatment facility).

The City of Seattle contracts for renewable energy from the gas power plant at the Columbia Ridge Landfill. The power plant captures methane gas created by decomposing garbage then uses it to fuel turbines that produce electricity. The plant is designed to produce 12.8 average megawatts of electricity, enough to power 12,500 homes.⁶¹

Chemical Waste Management of the Northwest (Hazardous Waste Facility)⁶²

The facility can accept a wide range of hazardous and nonhazardous wastes at the site for landfilling, storage, transfer, evaporative treatment, bio-remediation, and/or stabilization. The facility is permitted to accept asbestos, auto shredder residue, CAMU-eligible waste as approved by ODEQ, contaminated soils (RCRA, and PCB), CERCLA wastes, contaminated debris and equipment, drummed wastes, flammable/corrosive/reactive wastes, sludges (industrial), concrete and asphalt, characteristic wastes (metals, organics) NORM/TENORM and state regulated wastes. The facility is not permitted to accept radioactive materials, sewage or biological sludges, among others.

⁵⁹ TansCanada Corp. TransCanada GTN System Overview. [https://tcplus.com/GTN#:~:text=Gas%20Transmission%20Northwest%20\(GTN\)%20is,in%20Washington%2C%20Oregon%20and%20California.](https://tcplus.com/GTN#:~:text=Gas%20Transmission%20Northwest%20(GTN)%20is,in%20Washington%2C%20Oregon%20and%20California.)

⁶⁰ CHWMEG, Inc. WMI Columbia Ridge Landfill. <http://www.chwmeg.org/asp/search/detail.asp?ID=501.>

⁶¹ WM Columbia Ridge Landfill and Green Energy Plant. <https://www.wmnorthwest.com/landfill/columbiaridge.htm>

⁶² WasteManagement Solutions. Chemical Waste Management. <https://www.wmsolutions.com/locations/details/id/247>

Water Supply and Wastewater Treatment

The cities of Arlington and Condon both provide community water and sewer service to their city residents.

City of Arlington⁶³:

Water Supply: Wells (3)
Operator: The City of Arlington operates two wells
 Army Corps of Engineers operates one well
Wastewater Treatment System:
Operator: City of Arlington
Age of System: 1962

City of Condon⁶⁴:

Water Supply: Wells (8), spring
Operator: City of Condon
Age/Capacity of System:

<u>Well Number</u>	<u>Year Drilled</u>	<u>Depth</u>	<u>Pumping Rate*</u>
#1**	1947	80 ft	63 gpm
#2	1950	120 ft	55 gpm
#3	1962	74 ft	130 gpm
#4	1967	90 ft	55 gpm
#5	1968	174 ft	150 gpm
#6	1999	93 ft	90 gpm
#7	1999	98 ft	50 gpm
#8	1999	44 ft	107 gpm
Spring	N/A	N/A	120 gpm
Total			820 gpm

*GPM - gallons per minute; **Well is inactive but can be reactivated if needed.

Notes: All eight wells and spring discharge into a 109,000 gallon wet well. Two 125 horsepower (hp) turbines discharge into an eight inch line that connects to an 850,000 gallon above ground storage, and then is gravity fed to the city's distribution system.

Wastewater Treatment System:

Operator: City of Condon
Age of System: Treatment plant – 1997
 Collection system – 1951
Capacity of System: Pump #1 – 250 gpm
 Pump #2 – 250 gpm
 Lagoon Storage – 23 million gallons

Notes: 38.8 acres of irrigated (reclaimed water), and center pivot Alfalfa cut and bailed by a local rancher.

⁶³ Shanna Gronquist, City of Arlington Public Works. Personal communication 2023.

⁶⁴ Gibb Wilkins, City of Condon Public Works. Personal communication 2023.

City of Lonerock:
Water Supply: Wells (2)
Operator: The City of Lonerock

Telecommunications

A number of telecommunication providers are available in Gilliam County. According to Oregon Public Utility Commission, the following companies provide services to the county: AT&T Mobility LLC, CenturyLink, Gorge Networks, HughesNet, J & N Cable Systems, Inc., Level 3 Communications, LLC, New Edge Network, Inc., SawNet, Sprint, StarBand Communications, TDS Telecom, Verizon Wireless, WildBlue Communications, Inc and Starlink High-Speed Internet.⁶⁵

Public-Safety Access Point

Frontier 911 is the call center responsible for answering emergency calls for police, firefighting, and ambulance services in Gilliam, Sherman, Jefferson and Wheeler Counties. The call center is stationed at 135 S. Main Street in Condon.

Critical Facilities

Critical facilities are those facilities that are essential to government response and recovery activities (e.g., hospitals, police, fire and rescue stations, school districts and higher education institutions).⁶⁶ The interruption or destruction of any of these facilities would have a debilitating effect on incident management. Critical facilities in Gilliam County are identified in Table C.23 below and specifically named in Table 2.22 in Volume I, Section 2 Risk Assessment.

Table C.23: Critical Facilities

Facility Type	County Total
Hospitals (# of beds)	0 (0)
Sheriff's/Police Offices	3
Fire and EMS Stations	3
Dams	0
County Road Bridges	16
School Districts (# of schools)	2 (4)
Airports	4
<i>Public Airports</i>	2
<i>Private Airports</i>	2

Source: Gilliam County NHMP Steering Committee, June 2023

Hospitals

There is no hospital located in Gilliam County, only medical clinics. Nearby hospitals include the Pioneer Memorial Hospital in Heppner and the Mid-Columbia Medical Center in The Dalles.

⁶⁵ Oregon Broadband Mapping Project. <http://broadband.oregon.gov/StateMap/index.html>.

⁶⁶ State of Oregon Natural Hazards Mitigation Plan, Region 5: Mid-Columbia Regional Profile.

City of Arlington: Arlington Medical Center is located in Arlington and provides primary care.

City of Condon: South Gilliam County Medical Center is located in Condon and provides primary care.

City of Lonerock: No medical centers located in Lonerock.

Police⁶⁷

The Oregon State Police and the Gilliam County Sheriff's Office serve Gilliam County. The Sheriff Office has seven full time deputies and a reserve deputy. The Sheriff manages the inmate work crew program and is responsible for the 911 center, parole & probation, search and rescue, NORCOR jail facility, 911 funds, emergency management, and law enforcement services to the Cities of Arlington and Condon.

Fire and Rescue⁶⁸

Gilliam County has two Rural Fire Protection Districts that cover the entire county. The Fire Districts are staffed primarily by volunteers. The North Gilliam County Rural Fire Protection District contains about 374 square miles (30.3-percent of the county) while the South District has 788 square miles (64.4-percent). Despite this large area, the County as a whole averages 30 fires per year, with roughly 20 taking place in North Gilliam and 10 taking place in South Gilliam. Oregon Department of Forestry Protection District services fourteen square miles of Gilliam County in the southeast part of the County and contains the City of Lonerock, however Lonerock is serviced primarily by South Gilliam County RFPD.

School Districts

Gilliam County has two school districts, the Arlington School District and the Condon School District. Four schools are located in the County, two elementary schools and two high schools. The North Central Education Service District also provides educational services in the county.

Dependent Facilities

In addition to the critical facilities mentioned in Table C.23, there are other facilities that are vital to the continued delivery of health services and may significantly impact the public's ability to recover from emergencies. Assisted living centers 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. Summit Springs Village, located in Condon, is the only assisted living facility in Gilliam County.⁶⁹ The facility is licensed for 38 residents and is comprised of 23 apartments and six duplex cabins. In addition, the Summit

⁶⁷ Gilliam County Website. Departments. Sherriff Office. https://www.co.gilliam.or.us/government/sheriff_s_office/index.php

⁶⁸ Gilliam County Wildfire Protection Plan 2022.

⁶⁹ Summit Springs Village Quality Retirement and Assisted Living. <https://summitspringsvillage.com/>

Springs Village Memory Care Facility is located separate from the main building. This licensed facility has a capacity of eight beds.

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 lifelines, are critical to maintain during a disaster and are essential for proper functioning and response. 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.

Community Connectivity Capacity

Social Organizations

Social systems can be defined as community organizations and programs that provide social and community-based services, such as health care or housing assistance, to the public. In planning for natural hazard mitigation, it is important to know what social systems exist within the community because of their existing connections to the public. Often, actions identified by the plan involve communicating with the public or specific subgroups within the population (e.g. elderly, children, low income). The County can use existing social systems as resources for implementing such communication-related activities because these service providers already work directly with the public on a number of issues, one of which could be natural hazard preparedness and mitigation.

The following table highlights organizations that are active within the community and may be potential partners for implementing mitigation actions. The table includes information on each organization or program's service area, types of services offered and populations served. Below are different ways each organization or program could be involved in natural hazard mitigation. The three involvement methods are defined below.

- 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.

Table C.24 Community Service Organizations

Name and Contact Info	Description
<p>Condon Arts Council PO Box 874 Condon, OR 97823 541-705-5671 https://condonarts.org/</p>	<p>A 501 3(c) dedicated to providing exposure to the arts for all age ranges in Gilliam County. They provide several youth programs.</p>
<p>Pioneer Community Development Corporation PO Box 776 Condon, OR 97823 541-384-3769 https://pioneercdc.com/</p>	<p>PCDC was established to help meet the demand for housing in rural Gilliam County. The purpose of the program is to improve and increase the availability of quality housing in Gilliam County towns of Condon and Arlington.</p>
<p>Environmental Sentry Corp 100 Port Island Road Arlington, OR 97812 541-705-2004 https://www.portofarlington.com/home.html</p>	<p>The Environmental Sentry Corp is a 501 3(c) run by the Port of Arlington. Its purpose is to serve as a vehicle for brownfield remediation, asbestos cleanup, and environmental remediation of properties throughout Gilliam County.</p>
<p>Arlington Lions Club</p>	<p>The Arlington Lions Club’s motto is “help where help is needed – in our own communities and around the world.” In Arlington, the Lions help support community events, including community breakfasts and school events.</p>
<p>Gilliam County Historical Society 505 North Washington ST Condon, OR 97823 541-384-4233 https://gilliamcountyhistory.wixsite.com/website</p>	<p>The Gilliam County Historical Society runs the Gilliam County Museum and is devoted to creating a living, interactive learning experience through events and exhibitions.</p>
<p>Arlington Youth Athletics PO Box 202 Arlington, OR 97812</p>	<p>Arlington Youth Athletics is a program for youth in the community.</p>
<p>Gilliam County Senior Meal Sites 221 S. Oregon St. PO Box 427 Condon, OR 97823 541-351-9515</p>	<p>Gilliam County Senior Meal sites provide meals once a week to senior citizens in Arlington and Condon. They also provide meal delivery services.</p>
<p>Arc of the Mid-Columbia PO Box 521 The Dalles, OR 97058 http://arcmidcolumbia.org/</p>	<p>The Arc serves individuals with intellectual and developmental disabilities and their families in our communities in Hood River, Wasco, Sherman, and Gilliam Counties.</p>
<p>Eastern Oregon Support Service Brokerage 1810 Belmont Ave, Hood River, OR 97031 541-387-3600 http://new.eossb.org/</p>	<p>The Eastern Oregon Support Service Brokerage represents and supports people with disabilities in Eastern Oregon to achieve control over their lives and to participate in satisfying lifestyles based on the same aspirations for all citizens.</p>

<p>Legal Aid Services of Oregon 520 SW 6th Avenue, Suite 700 Portland, OR 97204 503-224-4086 https://lasoregon.org/</p>	<p>Legal Aid Services of Oregon (LASO) is a statewide nonprofit organization that provides access to legal help for people to protect their livelihoods, their health, and their families. Through staff attorneys and hundreds of volunteers, LASO gives free legal help to thousands of low-income and elderly clients each year in matters relating to their physical safety, access to food and shelter, and other critical legal needs.</p>
<p>North Central Education Service District 135 S. Main St Condon, OR 97823 1-800-450-2732 https://www.ncesd.k12.or.us/</p>	<p>NCESD exists to assist component school districts in meeting the requirements of state and federal law, to improve student learning, to enhance the quality of instruction provided to students, to provide professional development to component school district employees, to enable component school districts and the students who attend schools in those districts to have equitable access to resources, and to maximize operational and fiscal efficiencies for component school districts. NCESD provides services to approximately 700 students in a 3,500 square-mile geographic area.</p>
<p>Oregon Dept. of Human Services District 9 103 S Main Street PO Box 65 Condon, OR 97823 541-384-4252 https://www.oregon.gov/dhs/pages/index.aspx</p>	<p>The Department of Human Services (DHS) is Oregon’s principal agency for helping Oregonians achieve wellbeing and independence through opportunities that protect, empower, respect choice, and preserve dignity, especially for those who are least able to help themselves. DHS provides direct services to more than 1 million Oregonians each year. These services provide a key safety net for those in our society who are most vulnerable or who are at a difficult place in their life.</p>
<p>Women, Infants, and Children (WIC) 419 East 7th St., Rm 100 The Dalles, OR 97058 http://ncphd.org/programs/womeninfants-children-wic/</p>	<p>Food, nutrition counseling, and access to health services are provided to low-income women, infants, and children, under the Special Supplemental Nutrition Program for Women, Infants, and Children, popularly known as WIC. WIC provides Federal grants to States for supplemental foods, health care referrals, and nutrition education for low-income pregnant, breastfeeding, and non-breastfeeding postpartum women, and to infants and children who are found to be at nutritional risk.</p>
<p>Frontier CASA (Court Appointed Special Advocates) PO Box 66 Fossil, OR 97830 541-256-6040 https://www.frontiercasaforchildren.org/</p>	<p>Frontier CASA is a 501(c)(3) that services Gilliam and Wheeler Counties to recruit, train and supervise community volunteers who focus on the needs of children who are in foster care.</p>

Civic Engagement

Civic engagement and involvement are important indicators of community connectivity. Whether it is engagement through outlets such as volunteerism or through local, state, and national politics, you can gauge the connection people have to their community by the more they are willing to help out.

Those who are more invested in their community may also have a higher tendency to vote in political elections. Below, Table C.25 outlines voter participation and turnout percentages from the 2016 Presidential General Election compared to the 2022 General Election. The 2016 Presidential General Election resulted in an 86.4% voter turnout in Gilliam County, while the 2022 General Election only resulted in a turnout of 72% voter participation.⁷⁰ However, both of these elections saw a higher turnout than the overall voter participation reported in Oregon.⁷¹

Table C.25: Voter Turnout Percentages

Jurisdiction	2016 Presidential General Election*		2022 General Election	
	Gilliam County*	Oregon^	Gilliam County	Oregon^
Total - Registered Voters	1,275	2,561,657	1,413	2,985,820
Total - Ballots Cast	1,060	2,056,310	1,018	1,997,689
Voter Turnout Percentage	86.4%	80.3%	72.0%	66.9%

Source*: Oregon Blue Book Election Results

Source: Oregon Secretary of State, Election History, 2020, 2022

Cultural Resources

Cultural resources provide residents with a sense of belonging and provide a glimpse into the past to teach current residents about the histories and lives of past residents. Historic sites, museums, and libraries are just a few resources that give residents and visitors a sense of cultural connectivity to a place. These resources celebrate history and help define an area that people call *home*.

Libraries and Museums

Libraries and Museums are other facilities which a community will use to stay connected. Because all but one city within the county operates a public library, these facilities should be considered a common place for the community to gather during a disaster, as well as and serve a critical function in maintaining a sense of community. Below, Table C.26 lists the two libraries and one museum located in Gilliam County.

⁷⁰ Oregon Secretary of State, Election History, 2020, 2022, <https://sos.oregon.gov/elections/Pages/electionhistory.aspx>

⁷¹ Oregon Blue Book. Accessed 05 June 2018. <http://bluebook.state.or.us/state/elections/elections04.htm>.

Table C.26: List of Libraries and Museums in Sherman County

Site Name	Location
Arlington Public Library	Arlington
Gilliam County Library	Condon
Gilliam County Historical Society Depot Museum	Condon

Source: Oregon Museum Association, Oregon Public Libraries

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. As a preservation of history, it is important to also consider museums in the mitigation process for community resilience, as these structures should be protected in critical times, especially disasters.

Historic Places

The National Register of Historic Places lists all types of facilities and infrastructure that help define a community. Whether it is the first schoolhouse in town or even just the home of a resident who played a vital role in the success of the community, the *Register* lists all types of historic features that characterize the area. Table C.27 summarizes the three National Historic Sites or Districts throughout Gilliam County. All three are located in the City of Condon.

Table C.27: List of National Register of Historic Places in Gilliam County

Site Name	Location
Condon Commercial Historic District	Condon
S.B. Baker Building	Condon
Silas A. Rice Log House	Condon

Source: National Register of Historic Places <https://www.nps.gov/subjects/nationalregister/database-research.htm#table>

Table C.28 identifies the 36 listed resources located in the Condon Commercial Historic District.

These places provide current residents, youth, and visitors with a sense of community. Because of the history behind these sites, and their role in defining a community, it is important to protect these *historic sites* from the impacts natural disasters might have on them.

Table C.28: Condon Commercial Historic District

Building	Address in Condon
Bank Block	135 S Main St
Bank Saloon	319 S Main St
BPOE	117 S Main St
Buckhorn Saloon	306 S Main St
Burns Garage	222 S Main St
Campbell Building	114 S Main St
City Hall #1	306 S Main St
City Hall; Masonic Hall	128 S Main St
Condon Grain Growers Coop Association Office	105 S Main St
Condon Milling Company	109 N Main St
Dunn Brothers	311 S Main St
Dunn Brothers Annex	307 S Main St
Farr Building	218 S Main St
Fatlands	110 S Main St
First National Bank	103 S Main St
First National Bank	310 S Main St
Gilliam County Bank	103 W Summit St
Hollen and Sons	134 S Main St
Home Telephone	119 W Gilliam St
Horner Law Office	217 S Main St
Horner, Moore & Co	213 S Main St
Hotel Condon	202 S Main St
IOOF Hall	207-209 S Main St
John F. Reisacher Building	201-203 S Main St
Liberty Theater	212 S Main St
Parman and Harris Building	122 N Oregon St
Parman and Harris Lumber Company	101 N Main St
Pilter Building	225 S Main St
Potter's Grocery	208 S Main St
Interior Warehouse Co.	211 S Main St
S.B. Baker Building (listed individually as well)	333 S Main St
Shelley's Garage	102 N Main St
U.S. Post Office	129 S Main St
Union Oil Station	234 S Main St
Veterans Memorial Hall	120 S Main St
Weed Building	127 S Main St

Source: Oregon Historic Sites Database, <https://heritagedata.prd.state.or.us/historic/>

Community Stability

Residential Geographic Stability

Geographic stability is often a result of feeling connected to one’s community and a measure of one’s rootedness. A person’s place attachment refers to this sense of community and can often influence ones efforts to help revitalize a community.⁷² When looking at the percentage of regional residential stability one can determine that the higher the number of residents who have stayed in a geographic location, the more likely they are to have a place attachment. Regional residential stability is important to consider in the mitigation process as those who have been here awhile are more likely to have a vested interest in the area and should be more willing to help with hazard mitigation efforts. It is calculated by the number of people who have lived in the same house and those who have moved within the same county area a year ago, compared to the percentage of people who have not. Gilliam County is estimated to have 91.2% of its residents live in the same house or moved within the County⁷³. The figures of community stability are relatively consistent across the region.

Homeownership

Another measure of community stability and place attachment is homeownership. One does not seek to be a homeowner in a place they don’t feel safe and secure. Residents who become homeowners search for a place in which they are happy, protected, and able to afford a home. Homeownership is an indicator that residents will return to a community post-disaster, as these people are economically and socially invested in the community. Likewise, homeowners are more likely to take necessary precautions in protecting their property. Table C.28 identifies owner occupied housing units across the region; the remaining households are either renter occupied or are vacant.

Table C.28: Regional Homeownership 2021

County	Homeownership
Oregon	63.8%
Gilliam County	74.8%
Morrow County	80.6%
Sherman County	70.2%
Wasco County	65.8%
Wheeler County	71.4%

Source: ACS 2021(5-Year Estimates), DP04 Selected Housing Characteristics

⁷² Susan Cutter, Christopher Burton, and Christopher Emrich, “Disaster Resilience Indicators for Benchmarking Baseline Conditions,” *Journal of Homeland Security and Emergency Management* 7, no. 1 (2010): 9.

⁷³Gilliam County Community Profile, 2020 Census, U.S. Census Bureau

Table C.29 describes homeownership rates throughout the County. Most home mobility occurs in the City of Arlington, where seasonal employment is common.

Table C.29 Gilliam County Homeownership

Place	Homeownership
Arlington	66.1%
Condon	80.4%
Lonerock	100%
Gilliam County	74.5%

Source: ACS 2022(5-Year Estimates) Social Explorer Table DP04; U.S. Census Bureau

Synthesis

Community connectivity capacity places a strong emphasis on social structure, trust and norms, as well as 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 is dramatically different from one town to the next as they reflect the specific needs and composition of the community residents. A community with low residential stability may hinder the full potential social and cultural resources, adversely affecting the community's coping and response mechanisms.

Place attachment can be determined through a variety of outlets. Gilliam County has a wide range of resources that range from social organizations, civic engagement, and cultural capital that help support findings that suggest residents are well connected with a sense of community and regional stability. With a higher than average voter turnout percentage and an average percentages of regional stability, Gilliam County residents are involved. The county should consider investing time to inform and support its residents to build more resilient and better prepared communities, as they are more likely to return in the event of a disaster. Likewise, it is important to consider the roles such services and facilities can, and will, provide to residents during a disaster event.

Political Capital

Government Structure

Gilliam County's Mission is to provide essential public services, both legally required and locally desired, that protect and enhance the quality of life in an efficient, effective and respectful manner.

In Gilliam County, the administrative office is the office of the County Court. Gilliam County is a general law county governed by a three member County Court, consisting of a County Judge and two Commissioners. The County Judge is an elected, nonpartisan, full time position serving a six year term. The Judge functions as the day to day administrator of the county as well as chairman of the board and as Probate Judge. The two Commissioners are partisan positions who serve part time for a four year term. The Commissioners and Judge acting as the County Court, set policy for and represent Gilliam County in various forums. The County Court oversees all non-elected departments of the County. Although

the County Court shares the actual administration of County affairs with the elective department heads, it is, nevertheless, the focal point for decisions that must be made locally with respect to county affairs.⁷⁴

All the departments within the governance structure have some degree of responsibility in building overall community resilience. Each plays a role in ensuring that the county functions and normal operations resume after an incident, and the needs of the population are met. Some divisions and departments of Gilliam County government that have a role in natural hazard mitigation include:

- **Senior and Family Services:**⁷⁵ Coordinates between government agencies, service providers, non-profits, communities and families to support local families in becoming and remaining healthy. It's mission is to promote the well-being of all residents in Gilliam County. Because this department is in frequent contact with a vulnerable population, it would be a natural partner in mitigation actions for outreach efforts and to build the County's awareness of the needs of children and families.
- **Emergency Management:**⁷⁶ the department is located in the Gilliam County Sheriff's Office. The Sheriff is the director and Chris Fitzsimmons serves as the coordinator. Gilliam County is vulnerable to a variety of natural disasters including: droughts, earthquakes, floods, landslides, volcanic events, wildfires, windstorms, winter storms and extreme weather.⁷⁴
- **Fair Ground Facilities:**⁷⁷ Serves as an entertainment venue but is also used as a staging site for response efforts. Air conditioning units have been installed, as well as funding secured for an emergency generator to use the Fair Grounds as a mass sheltering location.
- **Gilliam County Public Health:**⁷⁸ The Gilliam County Public Health Department was established in 2021 and serves Gilliam County with the goal to provide quality programs and services that enhance the health and well-being of our communities. They offer programs that prevent diseases, promote wellness and protects the health of the community, with services ranging from immunizations to Prenatal and substance abuse care. Through the Public Health Emergency Preparedness (PHEP) Program develops plans and procedures to better prepare the counties to respond, mitigate, and recover from all public health emergencies.⁷⁵
- **Planning:**⁷⁹ is responsible for comprehensive land use planning for Gilliam County. The Gilliam County Zoning Ordinance provides the legal framework for the land use regulations in the County. The intent of the Comprehensive Plan is to establish a single, coordinated set of policies which will act to provide for orderly development of Gilliam County. These policies will give a direction to

⁷⁴Gilliam County Website. Departments. County Court. https://www.co.gilliam.or.us/government/county_court/index.php

⁷⁵Gilliam County Website. Senior and Family Services https://www.co.gilliam.or.us/government/family_services/index.php

⁷⁶Gilliam County Website. Emergency Management. https://www.co.gilliam.or.us/government/sheriff_s_office/emergency_management.php

⁷⁷Gilliam County Website. Fairgrounds. <https://www.co.gilliam.or.us/government/fairgrounds/index.php>

⁷⁸Gilliam County Public Health Website. <https://gilliamcountypublichealth.org/>

⁷⁹Gilliam County Website. Planning. https://www.co.gilliam.or.us/government/planning_department/index.php

planning, establish priorities for action, serve as a basis for future decisions, provide a standard by which progress can be measured, and promote a sense of community for an improved quality of life. It will also help all levels of government and private enterprise to understand the wants and needs of all Gilliam County citizens.

- **Road Department:**⁸⁰ The Gilliam County Road Department consists of a ten person crew and maintains 428 miles of road. Of those miles 295 are gravel road and 133 miles of pavement. Of the paved roads 81 miles are machine laid, and the remaining 52 miles are chip seal oil mats. The Road Department also maintains the 16 bridges located throughout the County. The Road Department will have important information about the resilience of the physical aspects of the community. This department can help to prioritize projects for mitigation and will be a key partner in implementation as well.
- **Sherriff's Office:**⁸¹ The Sheriff's Office currently employs seven full time deputies and a reserve deputy. The Sheriff is entrusted with the protection of his constituents through the enforcement of laws, protecting the United States Constitution and its Amendments. The Sheriff manages the inmate work crew program and is responsible for the 911 center, parole & probation, search and rescue, NORCOR jail facility, 911 funds, emergency management, and law enforcement services to the Cities of Arlington and Condon.
- **Weed Department:**⁸² maintains the weeds on thee roadsides, works to keep noxious weed at a minimum throughout the county and assist the area landowners with their needs. The Weed Department also does work for Oregon Department of Transportation, Bonneville Power Administration, Bureau of Land Management, Union Pacific Railroad, Corps of Engineers and Pacific Gas.⁷⁹ The department can help to prioritize projects for mitigation and will be a key partner in implementation as well, especially projects related to wildfire prevention.

Existing Plan & Policies

Communities often have existing plans and policies that guide and influence land use, land development and population growth. Such existing plans and policies can include comprehensive plans, zoning ordinances and technical reports or studies. Plans and policies already in existence have support from local residents, businesses and policy makers. Many land-use, comprehensive and strategic plans get updated regularly, and can adapt easily to changing conditions and needs. The Gilliam County Natural Hazards Mitigation Plan includes a range of recommended action items that, when implemented, will reduce the County's vulnerability to natural hazards.

⁸⁰ Gilliam County Website. Departments. Road.
https://www.co.gilliam.or.us/government/road_department/index.php

⁸¹ Gilliam County Website. Departments. Sherriff's Office.
https://www.co.gilliam.or.us/government/sherriff_s_office/index.php

⁸² Gilliam County Website. Departments. Weed Department.
https://www.co.gilliam.or.us/government/weed_department/index.php

Many of these recommendations are consistent with the goals and objectives of the County's existing plans and policies. Linking existing plans and policies to the Natural Hazards Mitigation Plan helps identify what resources already exist that can be used to implement the mitigation action items identified in the Plan.⁸³ Implementing the NHMP's action items through existing plans and policies increases their likelihood of being supported and getting updated, and maximizes the County's resources.

The following are a list of plans and policies already in place in Gilliam County:

Gilliam County Community Wildfire Protection Plan

- Date of Last Revision: September 2022
- Author/Owner: Gilliam County
- Description: The plan is a result of a county-wide effort initiated to identify and prioritize wildfire hazards and to develop a strategy to reduce those hazards. The plan assists the county, the communities within the county, and the fire districts in securing National Fire Plan grants, US Forest Service Community Wildfire Defense Grants and other funding sources to threat hazardous fuel situations and to better prepare residents for wildfires that may occur. It includes a strategy with action project that, when implemented, will decrease the potential for large wildfires in the county and reduce the loss of property and threat to human life.
- Relationship to the Natural Hazards Mitigation Plan: the Community Wildfire Protection Plan (CWPP) incorporates mitigation strategies for wildfires; information from the CWPP supports and informs the NHMP.
- Ability to Expand or improve: The CWPP is reviewed annually for project prioritization and accuracy. This plan can be expanded as the County sees fit.

Gilliam County Comprehensive Plan

- Date of Last Revision: July 2022
- Author/Owner: Gilliam County
- Description: The intent of the Gilliam County Comprehensive Plan is to establish a single, coordinated set of policies which will act to provide for orderly development of Gilliam County. These policies will give a direction to planning, establish priorities for action, serve as a basis for future decisions, provide a standard by which progress can be measured, and promote a sense of community for an improved quality of life. It will also help all levels of government and private enterprise to understand the wants and needs of all Gilliam County citizens.
- Relationship to the Natural Hazards Mitigation Plan: Goal 7 of the Gilliam County Comprehensive Plan provides the framework for the county to adopt inventories, policies, and implement measures to reduce risk to people and property from floods, landslides, earthquakes and related hazards, and wildfires. The following policies are in place to guide the identification of areas subject to natural hazards,

⁸³ Burby, Raymond J., ed. 1998. Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities.

regulation of development in those areas, and protection of citizens, property, and the environment from the effects of natural hazards.

- The county will continue to comply with FEMA requirements in order to maintain eligibility for the National Flood Insurance Program.
 - In order to preserve the flood-carrying capacity of stream channels and prevent damaging increases in flood heights, development in the floodway should be prohibited or strictly regulated.
 - Development in the floodplain should be regulated to protect life and property and minimize private losses and public costs for rescue and repair of flood-damaged structures. Residences should be elevated at least one foot above the base flood elevation.
 - Consideration should be given to development of flood control projects.
 - New buildings should comply with building codes setbacks from both rim and tow of slopes.
- Ability to expand or improve: The County can continue to update its comprehensive plan to keep pace State of Oregon and FEMA best practices and to accommodate new development.

Gilliam County Emergency Operations Plan

- Date of Last Revision: September 2010
- Author/Owner: Gilliam County
- Description: The Emergency Operations Plan (EOP) is an all-hazard plan that describes how Gilliam County will organize and respond to emergencies and disasters in the community. Specifically, the EOP describes the roles and responsibilities of departments and personnel within Gilliam County when an incident occurs, and it establishes high level guidance that supports implementation of the National Incident Management System (NIMS), including adherence to the concepts and principles of the Incident Command System (ICS).
- Relationship to the Natural Hazards Mitigation Plan: Support Annex D - Mitigation Plan, focuses on the ongoing effort to lessen the impact of disasters on people and property. The purpose of the annex is to develop efforts that strive to help the most people and that make the most effective use of resources as the highest priorities. By in large, the EOP attempts to be all-inclusive in combining the following four phases of emergency management:
 - *Mitigation:* activities that eliminate or reduce the vulnerability to disasters;
 - *Preparedness:* activities that governments, organizations, and individuals develop to save lives and minimize damage;
 - *Response:* activities that prevent loss of lives and property and provide emergency assistance; and
 - *Recovery:* short- and long-term activities that return all systems to normal or improved standards.
- Ability to expand or improve:The County can update their EOP to accomodate changes in development, population and resources as needed, and can expand it to be whatever they need.

Gilliam County Strategic Action Plan for Economic Development

- Date of Last Revision: 2021
- Author/Owner: Gilliam County
- Description: The Strategic Action Plan for Economic Development in Gilliam County is designated to guide local economic development efforts toward cooperative, measurable success. Development of the plan focused of a “foundation up” approach that brought together representatives from municipal governments, organizations, and local interest groups to forge a vision of economic prosperity for the area and measurable goals to achieve that vision.
- Relationship to the Natural Hazards Mitigation Plan: This plan has several goals, including promoting growth and prosperity, managing the budget for sustainable services and encouraging collaboration, cooperation and communication between Gilliam county communities. All of these goals support natural hazard planning through providing services, increasing outreach and promoting growth in non hazard prone zones.
- Ability to Expand or Improve: This plan can be expanded as Gilliam County's economy changes and can be adapted to FEMA and ODEM best practices.

Gilliam County Transportation System Plan

- Date of Last Revision: April 2015
- Author/Owner: Gilliam County
- Description: The Gilliam County Transportation System Plan guides the management of existing transportation facilities and the design and implementation of future facilities for the next 20 years. The plan constitutes the transportation element of the county’s comprehensive plan and satisfies the requirements of the Oregon Transportation Planning Rule established by the Department of Land Conservation and Development (DLCD). It identifies and prioritizes transportation projects for inclusion of the Oregon Department of Transportation’s (ODOT) Statewide Transportation Improvement Program (STIP).
- Relationship to the Natural Hazards Mitigation Plan: Transportation systems are important is evacuating and responding to natural disasters. Mitigation actions that focus on strengthening transportation systems can be incorporated into the Gilliam County Transportation System Plan.
- Ability to Expand or Improve: Gilliam County has the authority to include hazard mitigation items as necessary.

State of Oregon Building Codes

- Date of Last Revision: Current with State standards
- Author/Owner: Morrow County, State of Oregon
- Description: The Gilliam County Building Codes are adopted from the State of Oregon guidelines. They are regularly enforced; the Planning Department reports all known violations. The Building Codes identify standards for construction and development to mitigate damage and avoid unsound structures.
- Relationship to Natural Hazards Mitigation Plan: Building Codes enforce structural standards, including fire and storm resistant building materials, seismic stability, and defensible space. Mitigation actions focusing on resident resiliency can be incorporated into Building Codes.
- Ability to expand or improve: Gilliam County does not have the authority to update these codes.

Gilliam County Zoning Ordinances

- Date of Last Revision: 2022
- Author/Owner: Gilliam County
- Description: The Gilliam County Zoning Ordinances include Site Plan Review Requirements, Subdivision Ordinance, and acquisition of land for public use. Zoning Ordinances are regularly enforced.
- Relationship to Natural Hazards Mitigation Plan: Zoning Ordinances guide development and protection of natural resources. Mitigation actions can be implemented through the Zoning Ordinances.
- Ability to expand or improve: Gilliam County has the authority to update their zoning ordinances as development, population or hazard information changes.

Gilliam County Financial Resources

Financial Resources are always a limiting factor for any County project, and Hazard Mitigation is no exception. Below is a list of County Financial Resources, some of these resources the County has the capability to expand their mitigation capabilities by drawing more funds. The largest areas for expanding financial capacity is expanding grant writing and management capabilities, which is difficult on minimal county staff. Funding will always be a limiting capability.

- Capital Improvements project funding, if budgeted/approved
- Levy taxes for specific purposes, if budgeted/approved
- Incur debt through general obligation or special tax bonds, if voter approved
- Fees for water, sewer, and utilities
- Federal funding programs
- State funding programs

Synthesis

Political capital is recognized as the government and planning structures established within the community. In terms of hazard resilience, it is essential for political capital to encompass diverse government and non-government entities in collaboration; as disaster losses stem from a predictable result of interactions between the physical environment, social and demographic characteristics and the built environment.⁸¹ While Gilliam County has adequate plans and policies in place, specific planning documents may be amended and update to reduce hazards risk when siting residences or supplementary structures.

⁸¹ Mileti, D. 1999. Disaster by Design: a Reassessment of Natural Hazards in the United States. Washington D.C.: Joseph Henry Press.

APPENDIX D: ECONOMIC ANALYSIS

This appendix was developed by the Oregon Partnership for Disaster Resilience at the University of Oregon’s Community Service Center – now called the Institute for Policy Research and Engagement (IPRE) and used in the 2006-2007 Gilliam County NHMP. It has been reviewed and accepted by the Federal Emergency Management Agency (FEMA) as a means of documenting how the prioritization of actions shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

The appendix outlines three approaches for conducting economic analyses of natural hazard mitigation projects: Benefit/Cost Analysis, Cost-Effectiveness Analysis, and STAPLE/E approach. It describes the importance of implementing mitigation activities, different approaches to economic analysis of mitigation strategies, and methods to calculate costs and benefits associated with mitigation strategies.

Information in this section is derived in part from: The Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon Military Department – Office of Emergency Management, 2000), and 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 an economic analysis can be used to evaluate mitigation projects.

A full cost benefit analysis was not performed for the initial priority project identification, a modified STAPLE/E process was used. When picking which projects to work on annually, the steering committee will use the processes outlined in this annex.

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, which would otherwise be incurred. Evaluating possible natural hazard mitigation activities provides decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

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

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

Mitigation Strategy Economic Analyses Approaches

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

Benefit/Cost Analysis

Benefit/cost analysis is a key mechanism used by the Oregon Department of Emergency Management (ODEM), the 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 mitigation efforts exceed the cost of the mitigation activity. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to reduce or avoid disaster-related damages later. Benefit/cost analysis is based on calculating the frequency and severity of a hazard, avoiding future damages, and risk. In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented. A project must have a benefit/cost ratio greater than 1 (i.e., the net benefits will exceed the net costs) to be eligible for FEMA funding. Jurisdictions must use the FEMA BCA toolkit, latest version available, unless an alternate approach has been approved by FEMA. Jurisdictions must consult with the SHMO (State Hazard Mitigation Officer) if they intend on using an alternate approach. See <https://www.fema.gov/benefit-cost-analysis> for more information.

Cost-Effectiveness Analysis

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

Investing in Public Sector Mitigation Activities

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

Investing in Private Sector Mitigation Activities

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

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

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

STAPLE/E Approach

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

Using STAPLE/E criteria, mitigation activities can be evaluated quickly by steering committees in a synthetic fashion. This set of criteria requires the Steering Committee to assess the mitigation activities based on the Social, Technical, Administrative, Political, Legal, Economic and Environmental (STAPLE/E) constraints and opportunities of implementing the particular mitigation item in your community. The sixth chapter in FEMA's Local Mitigation Planning Handbook "Develop a Mitigation Strategy – Prioritize Mitigation Actions" 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.

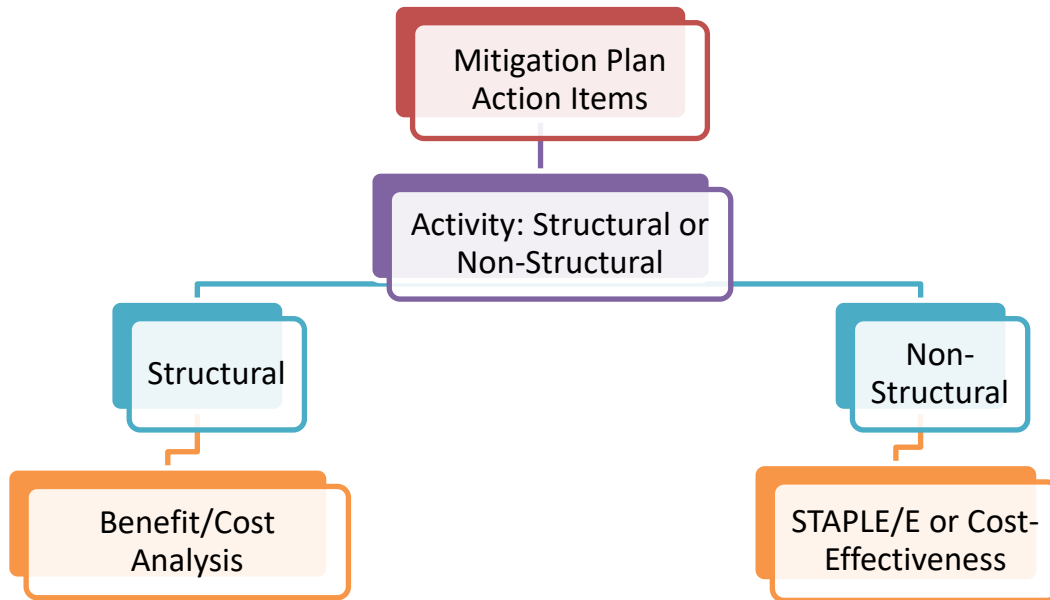
- How will the action impact the environment?
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

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

The following figure is to serve as a guideline for when to use the various economic analysis approaches.

Figure D-I Economic Analysis Flowchart



Source: Gilliam County, 2018

Implementing the Approaches

Benefit/cost analysis, cost-effectiveness analysis, and the STAPLE/E are three important tools that can be used in evaluating whether or not to implement a mitigation activity. Being aware of these different options is useful for the Steering Committee and local governments when making mitigation decisions, even if they don't follow the steps exactly.

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 using a variety of economic tools including existence value or contingent value theories. These theories provide quantitative data on the value people attribute to physical or social environments. Even without hard data, however, impacts of structural projects to the physical environment or to society should be considered when implementing mitigation projects.
- **Determine the correct discount rate.** Determination of the discount rate can just be the risk-free cost of capital, but it may include the decision maker's time preference and also a risk premium. Including inflation should also be considered.

3. Analyze and Rank the Activities

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

Net present value. Net present value is the value of the expected future returns of an investment minus the value of the expected future cost expressed in today's dollars. If the net present value is greater than the projected costs, the project may be determined feasible for implementation. Selecting the discount rate, and identifying the present and future costs and benefits of the project calculates the net present value of projects.

Internal rate of return. Using the internal rate of return method to evaluate mitigation projects provides the interest rate equivalent to the dollar returns expected from the project. Once the rate has been calculated, it can be compared to rates earned by investing in alternative projects. Projects may be feasible to implement when the internal rate of return is greater than the total costs of the project. Once the mitigation projects are ranked on the basis of economic criteria, decision-makers can consider other factors, such as risk, project effectiveness, and economic, environmental, and social returns in choosing the appropriate project for implementation.

Economic Returns of Natural Hazard Mitigation

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

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

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

Additional Costs from Natural Hazards

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

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

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

Additional Considerations

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

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

Resources

CUREe Kajima Project, *Methodologies for Evaluating the Socio-Economic Consequences of Large Earthquakes*, Task 7.2 Economic Impact Analysis, Prepared by University of California, Berkeley Team, Robert A. Olson, VSP Associates, Team Leader; John M. Eiding, 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 E: SURVEY RESULTS

Survey Purpose and Use

The public notices of the NHMP update, as described in Appendix B, included a link to an online survey which was posted on Facebook Pages and on posters in the Cities during this updated process. 12 residents responded. Survey responses were considered during the prioritization of hazards and selection of mitigation actions by the Gilliam County Steering Committee, including a significant increase in the number of wildfire mitigation action items, since wildfire was designated as the hazard that represented the largest concern to residents of Gilliam County. Furthermore, the survey served as a key component of public education and outreach for the NHMP. The online survey responses are detailed below.

Overall Survey Results

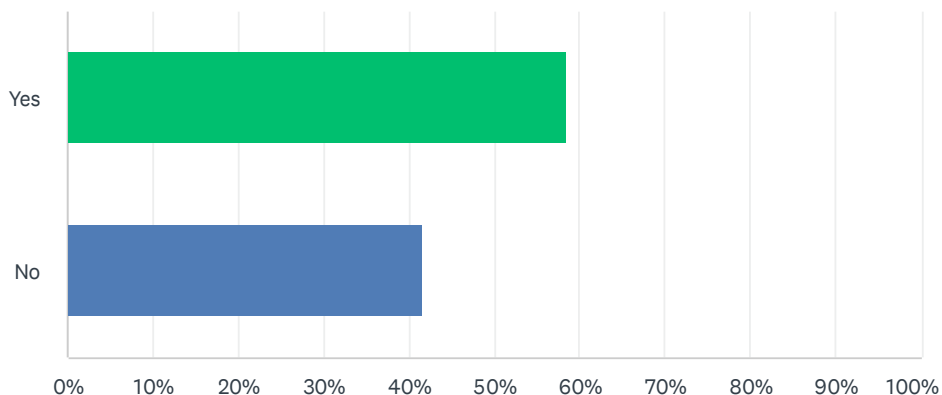
The survey consisted of 28 questions, and was created by FEMA as part of their hazard mitigation planning. Overall results of the 12 responses are shown in the following 47 pages. The survey questions are shown in full below along with all responses and are referred to as the resident survey.

The resident survey respondents reported highest concern about wildfire and winter storm, closely followed by extreme weather and wind storm. The Steering Committee determined windstorms were a lower concern due to the infrequent need for emergency services or property damage associated with wind events, although windstorms are common in Gilliam County.

Residents reported concerns that human (life/injury) and infrastructure were most vulnerable to hazards, with economic concerns being third. The Steering Committee determined that overall vulnerabilities for windstorm were low. The other hazards that residents identified as highest concern – wildfire, winter storm, and extreme weather – were confirmed by the Steering Committee. Survey respondents reported their mitigation priorities as protecting schools, fire/police stations, small businesses and elder care facilities. These were prioritized by the Steering Committee in several mitigation actions. See Section 3 Mitigation Strategy for a list of Gilliam County’s mitigation actions.

Q1 During the past five years in Gilliam County, have you or someone in your household directly experienced a natural disaster such as an earthquake, severe windstorm, flood, wildfire, or other type of natural disaster?

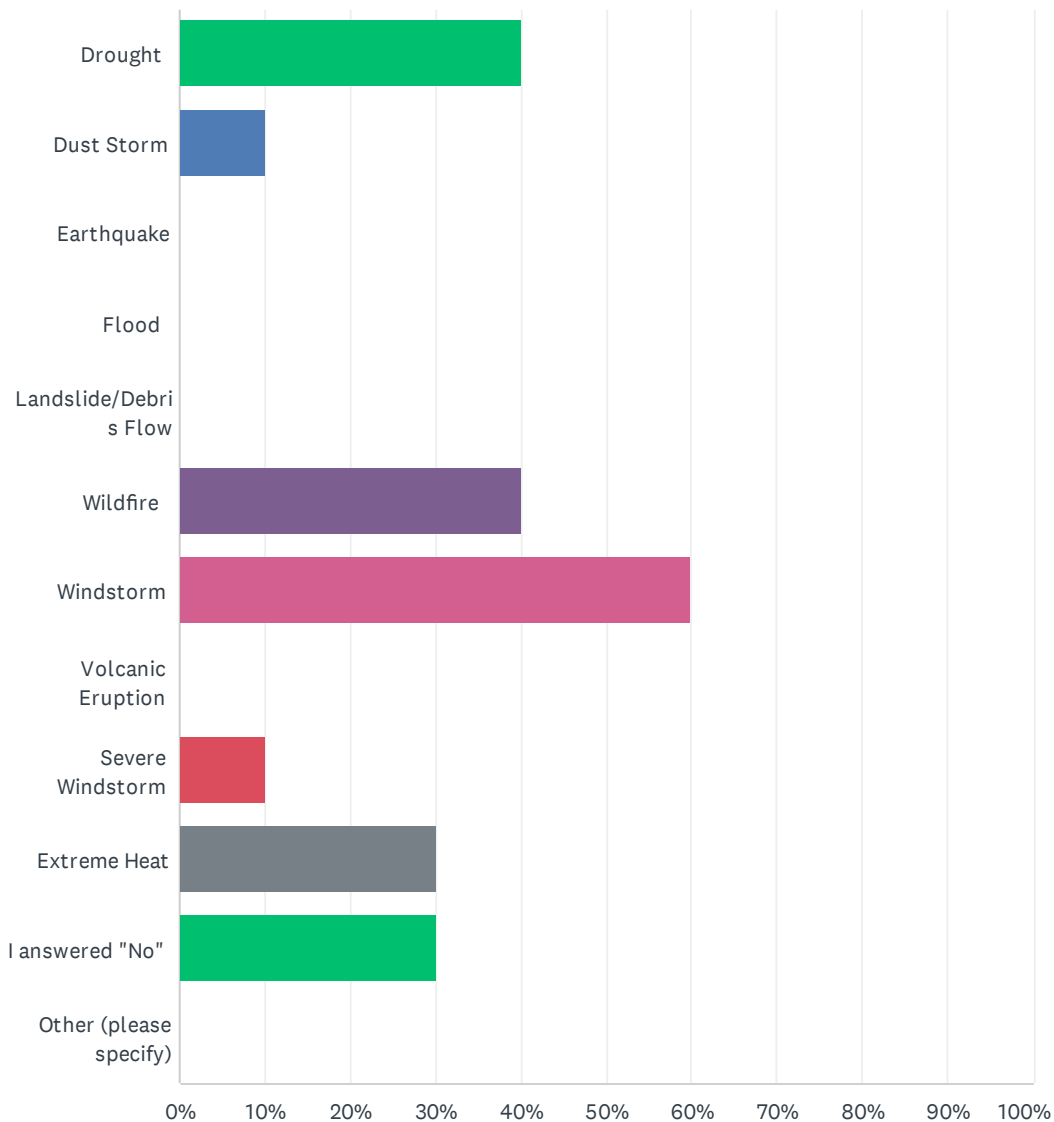
Answered: 12 Skipped: 0



ANSWER CHOICES	RESPONSES
Yes	58.33% 7
No	41.67% 5
TOTAL	12

Q2 If you answered YES to the previous question, which of these natural disasters have you or someone in your household experienced in the past five years?

Answered: 10 Skipped: 2



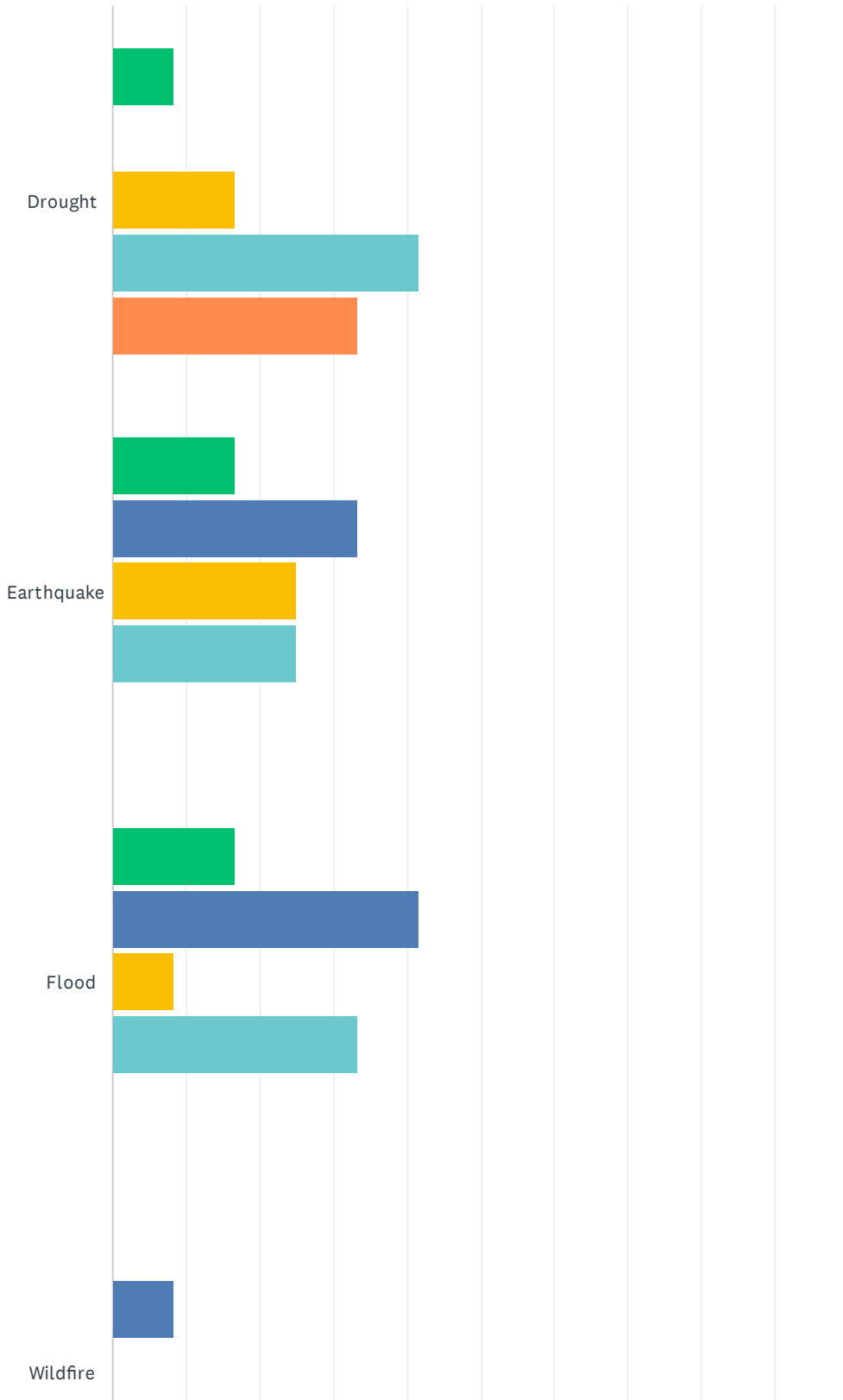
Gilliam County Natural Hazard Survey

ANSWER CHOICES	RESPONSES	
Drought	40.00%	4
Dust Storm	10.00%	1
Earthquake	0.00%	0
Flood	0.00%	0
Landslide/Debris Flow	0.00%	0
Wildfire	40.00%	4
Windstorm	60.00%	6
Volcanic Eruption	0.00%	0
Severe Windstorm	10.00%	1
Extreme Heat	30.00%	3
I answered "No"	30.00%	3
Other (please specify)	0.00%	0
Total Respondents: 10		

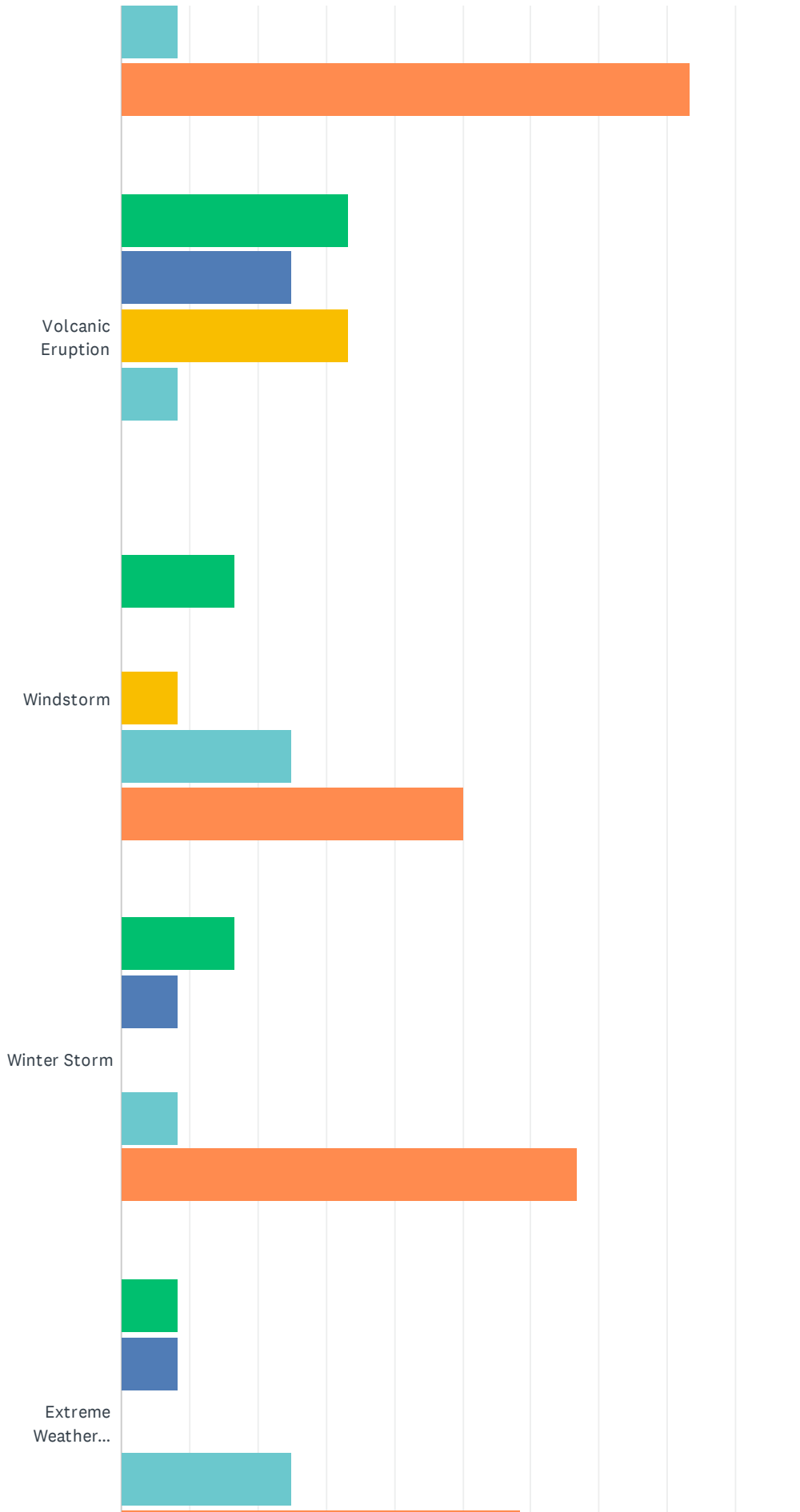
#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q3 How concerned are you about the following natural disasters affecting Gilliam County?

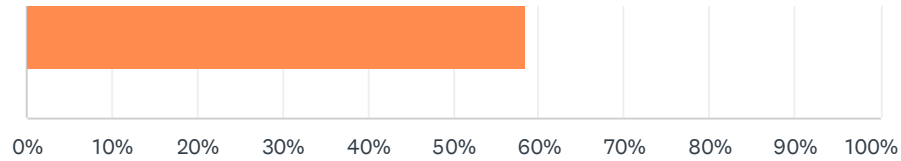
Answered: 12 Skipped: 0



Gilliam County Natural Hazard Survey



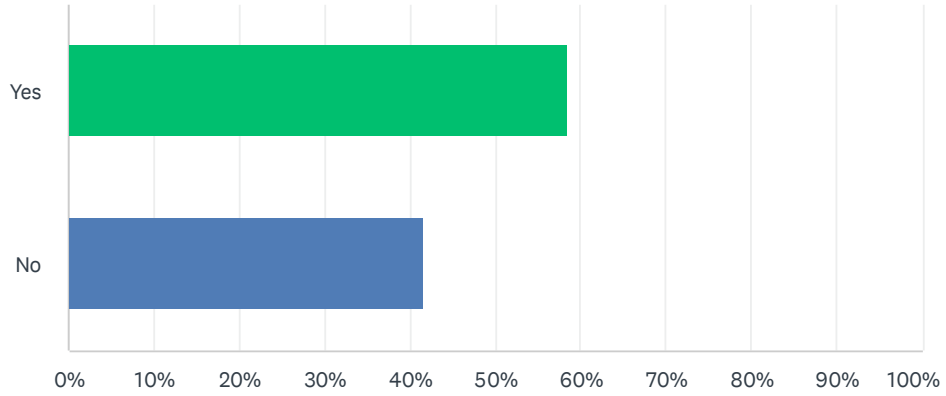
Gilliam County Natural Hazard Survey



	NOT CONCERNED	NOT VERY CONCERNED	NEUTRAL	SOMEWHAT CONCERNED	VERY CONCERNED	TOTAL	WEIGHTED AVERAGE
Drought	8.33% 1	0.00% 0	16.67% 2	41.67% 5	33.33% 4	12	3.92
Earthquake	16.67% 2	33.33% 4	25.00% 3	25.00% 3	0.00% 0	12	2.58
Flood	16.67% 2	41.67% 5	8.33% 1	33.33% 4	0.00% 0	12	2.58
Wildfire	0.00% 0	8.33% 1	0.00% 0	8.33% 1	83.33% 10	12	4.67
Volcanic Eruption	33.33% 4	25.00% 3	33.33% 4	8.33% 1	0.00% 0	12	2.17
Windstorm	16.67% 2	0.00% 0	8.33% 1	25.00% 3	50.00% 6	12	3.92
Winter Storm	16.67% 2	8.33% 1	0.00% 0	8.33% 1	66.67% 8	12	4.00
Extreme Weather (Extreme heat, extreme cold, hail)	8.33% 1	8.33% 1	0.00% 0	25.00% 3	58.33% 7	12	4.17

Q4 Have you ever received information about how to make members of your household and your home safer from natural disasters?

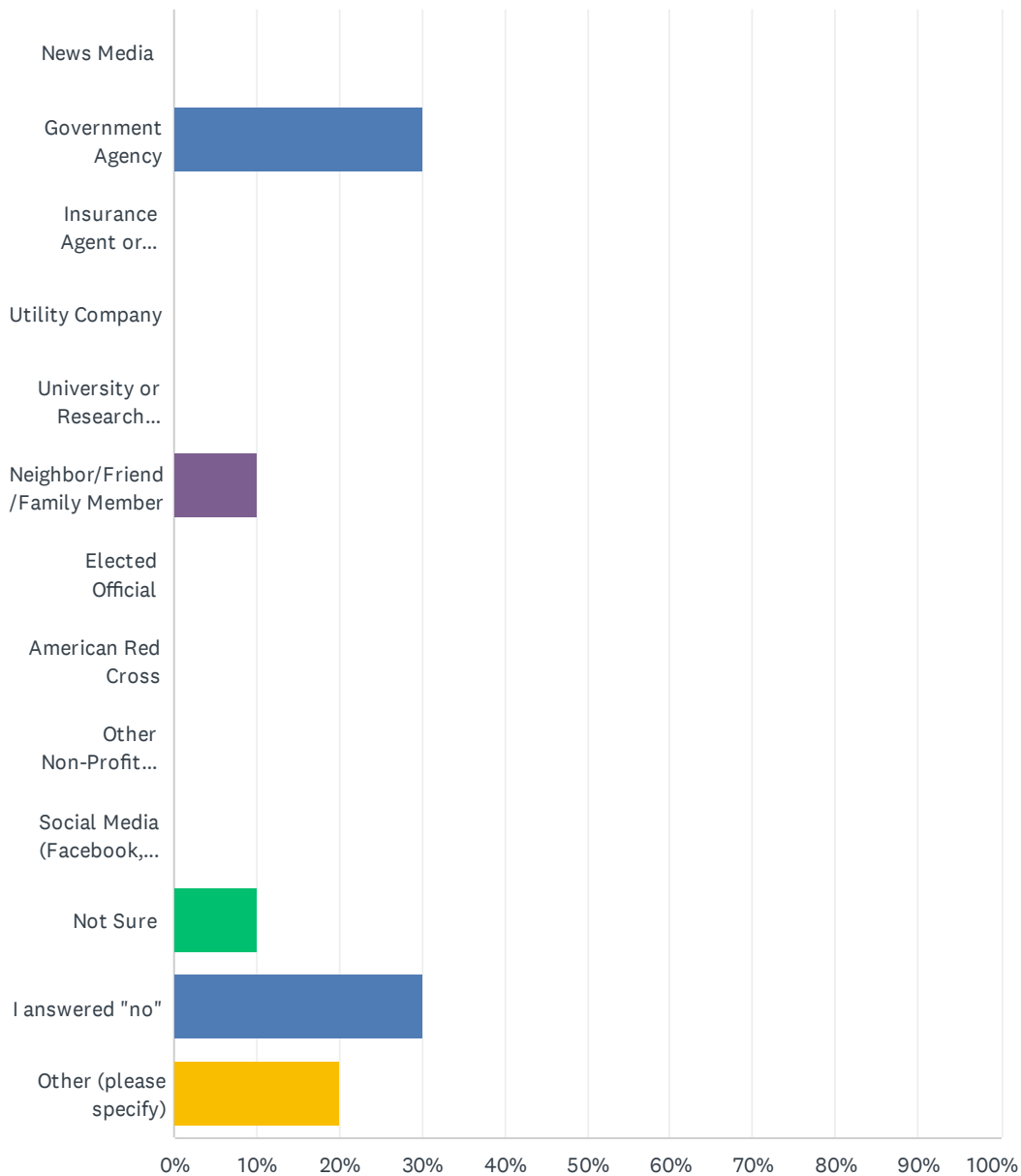
Answered: 12 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	58.33%	7
No	41.67%	5
TOTAL		12

Q5 If you answered "yes" from whom did you last receive information about how to make members of your household and your home safer from natural disasters?

Answered: 10 Skipped: 2



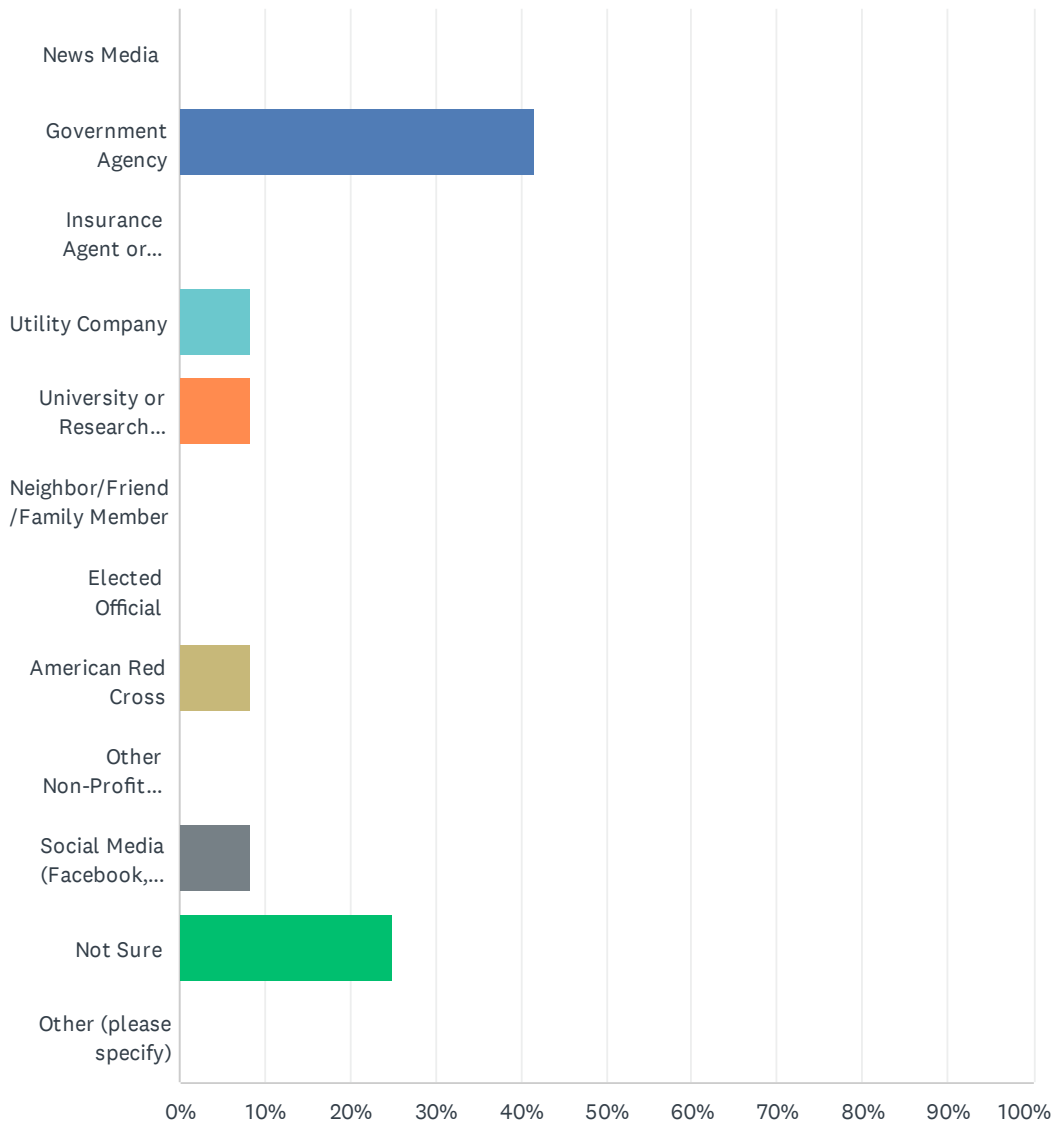
Gilliam County Natural Hazard Survey

ANSWER CHOICES	RESPONSES	
News Media	0.00%	0
Government Agency	30.00%	3
Insurance Agent or Company	0.00%	0
Utility Company	0.00%	0
University or Research Institution	0.00%	0
Neighbor/Friend/Family Member	10.00%	1
Elected Official	0.00%	0
American Red Cross	0.00%	0
Other Non-Profit Organization	0.00%	0
Social Media (Facebook, Instagram, etc.)	0.00%	0
Not Sure	10.00%	1
I answered "no"	30.00%	3
Other (please specify)	20.00%	2
TOTAL		10

#	OTHER (PLEASE SPECIFY)	DATE
1	Internet	1/20/2024 10:46 AM
2	I get a text message, I cannot remember who it's from or where I signed up for the text.	11/2/2023 9:07 AM

Q6 Whom would you most trust to provide you with information about how to make your household and home safer from natural disasters?

Answered: 12 Skipped: 0



Gilliam County Natural Hazard Survey

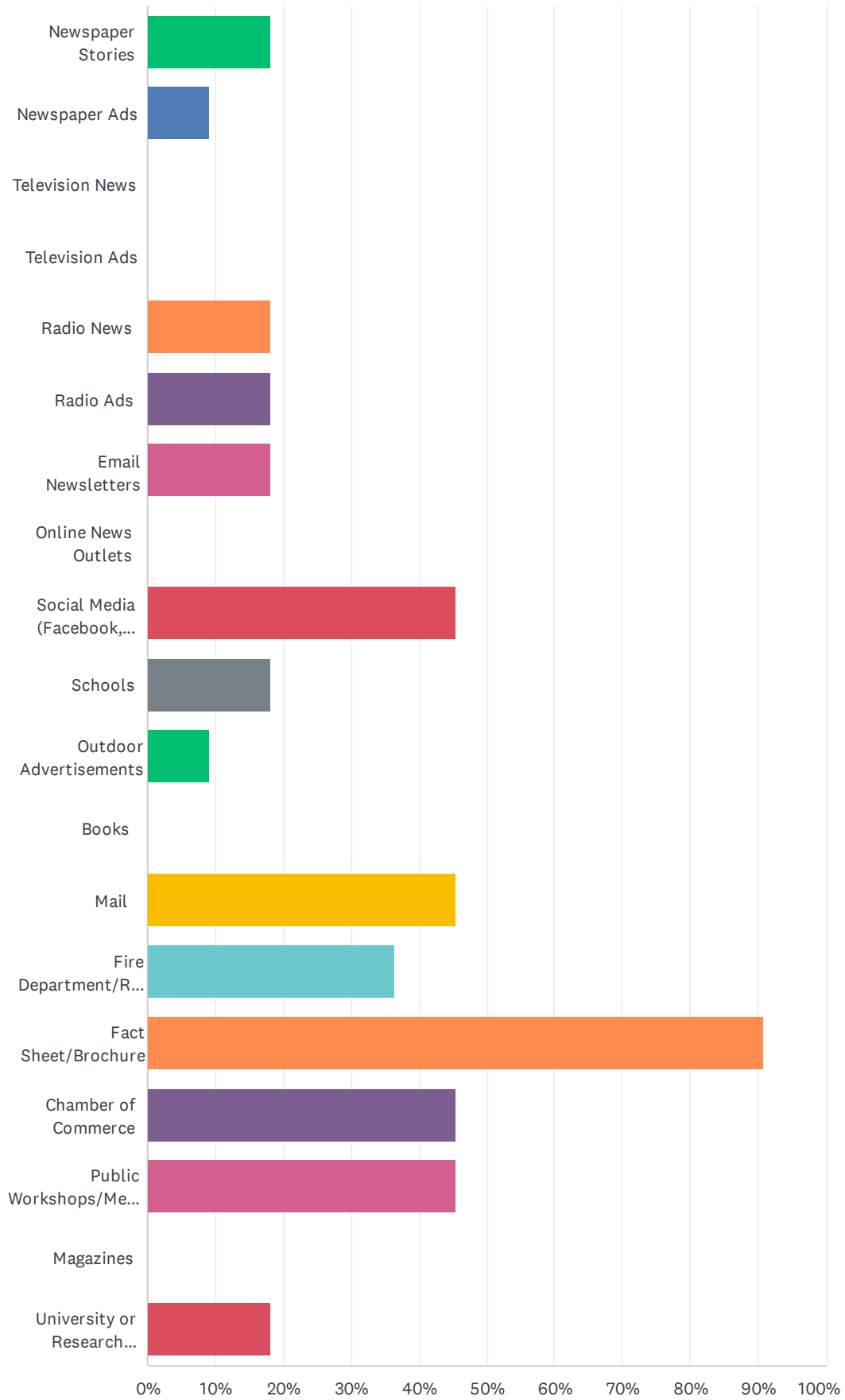
ANSWER CHOICES	RESPONSES	
News Media	0.00%	0
Government Agency	41.67%	5
Insurance Agent or Company	0.00%	0
Utility Company	8.33%	1
University or Research Institution	8.33%	1
Neighbor/Friend/Family Member	0.00%	0
Elected Official	0.00%	0
American Red Cross	8.33%	1
Other Non-Profit Organization	0.00%	0
Social Media (Facebook, Instagram, etc.)	8.33%	1
Not Sure	25.00%	3
Other (please specify)	0.00%	0
TOTAL		12

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q7 What is the most effective way for you to receive information about how to make your household and home safer from natural disasters?
(Please select up to three)

Answered: 11 Skipped: 1

Gilliam County Natural Hazard Survey

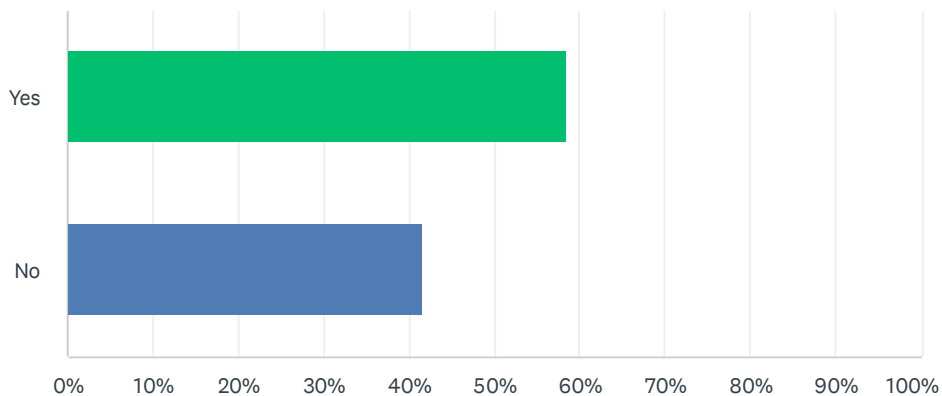


Gilliam County Natural Hazard Survey

ANSWER CHOICES	RESPONSES	
Newspaper Stories	18.18%	2
Newspaper Ads	9.09%	1
Television News	0.00%	0
Television Ads	0.00%	0
Radio News	18.18%	2
Radio Ads	18.18%	2
Email Newsletters	18.18%	2
Online News Outlets	0.00%	0
Social Media (Facebook, Instagram, ect)	45.45%	5
Schools	18.18%	2
Outdoor Advertisements	9.09%	1
Books	0.00%	0
Mail	45.45%	5
Fire Department/Rescue	36.36%	4
Fact Sheet/Brochure	90.91%	10
Chamber of Commerce	45.45%	5
Public Workshops/Meetings	45.45%	5
Magazines	0.00%	0
University or Research Institution	18.18%	2
Total Respondents: 11		

Q8 Prior to receiving this survey, were you aware of Gilliam County's Natural Hazard Mitigation Plan (NHMP)?

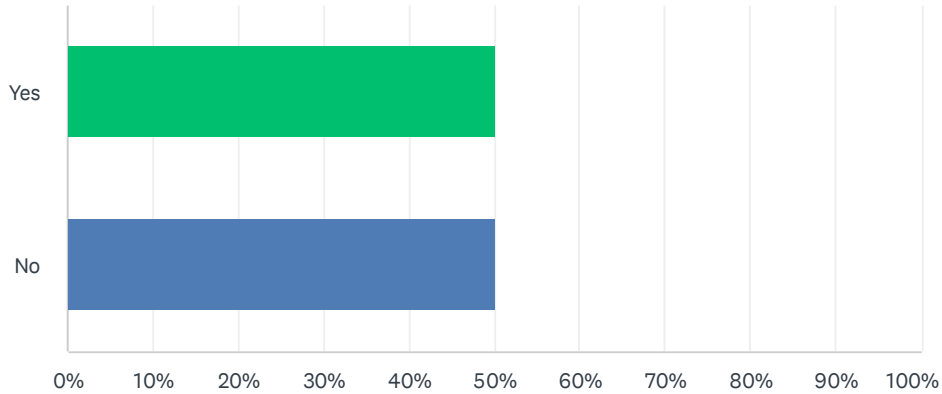
Answered: 12 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	58.33%	7
No	41.67%	5
TOTAL		12

Q9 Prior to receiving this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires Gilliam County to update the NHMP every five years in order for your county to be eligible for federal pre-and post-disaster hazard mitigation funds?

Answered: 12 Skipped: 0



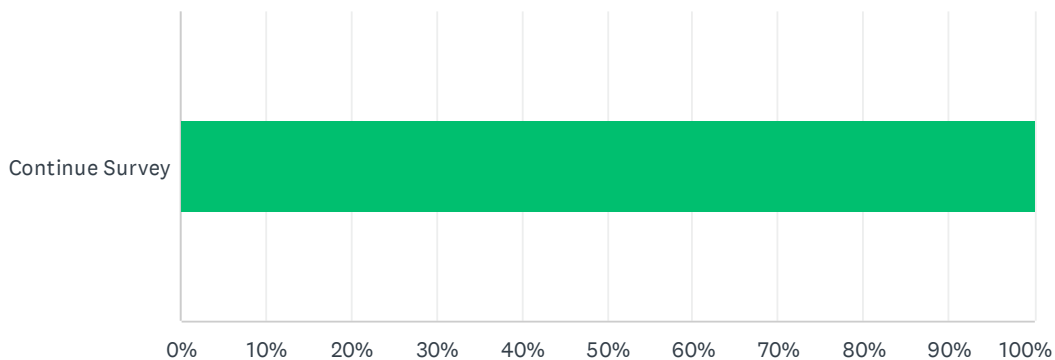
ANSWER CHOICES	RESPONSES
Yes	50.00% 6
No	50.00% 6
TOTAL	12

Q10 COMMUNITY VULNERABILITIES AND HAZARD MITIGATION STRATEGIES

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (e.g., populations with functional needs, economic components, environmental resources, etc.).

The next set of questions will focus on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

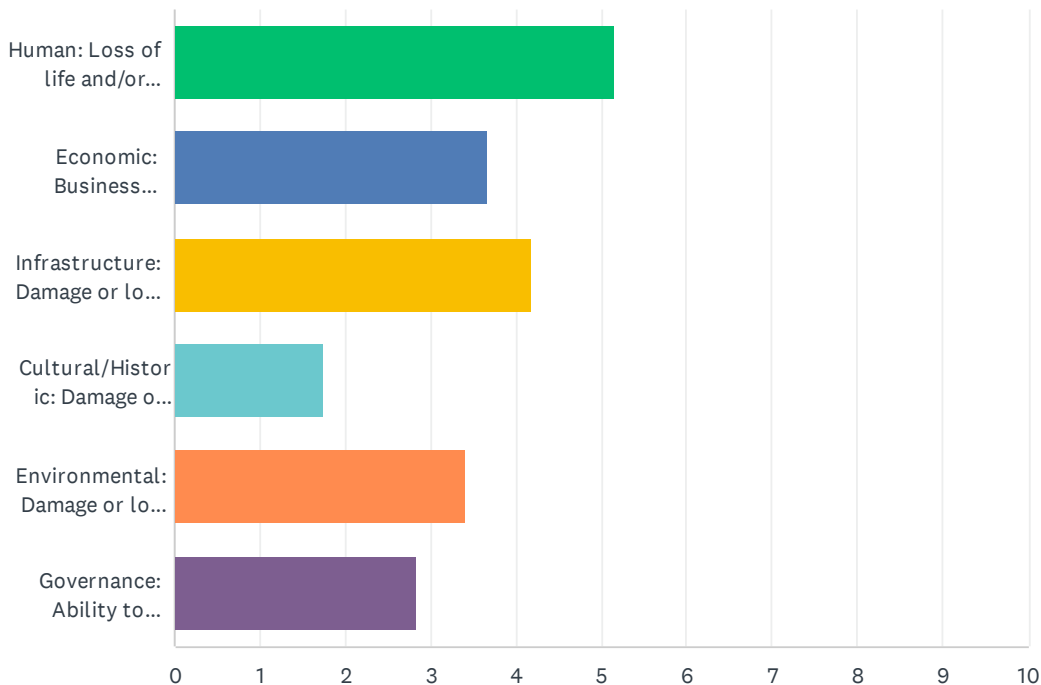
Answered: 12 Skipped: 0



ANSWER CHOICES	RESPONSES
Continue Survey	100.00% 12
TOTAL	12

Q11 Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, which of the following categories are most susceptible to the impacts caused by natural hazards in your county? (please rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

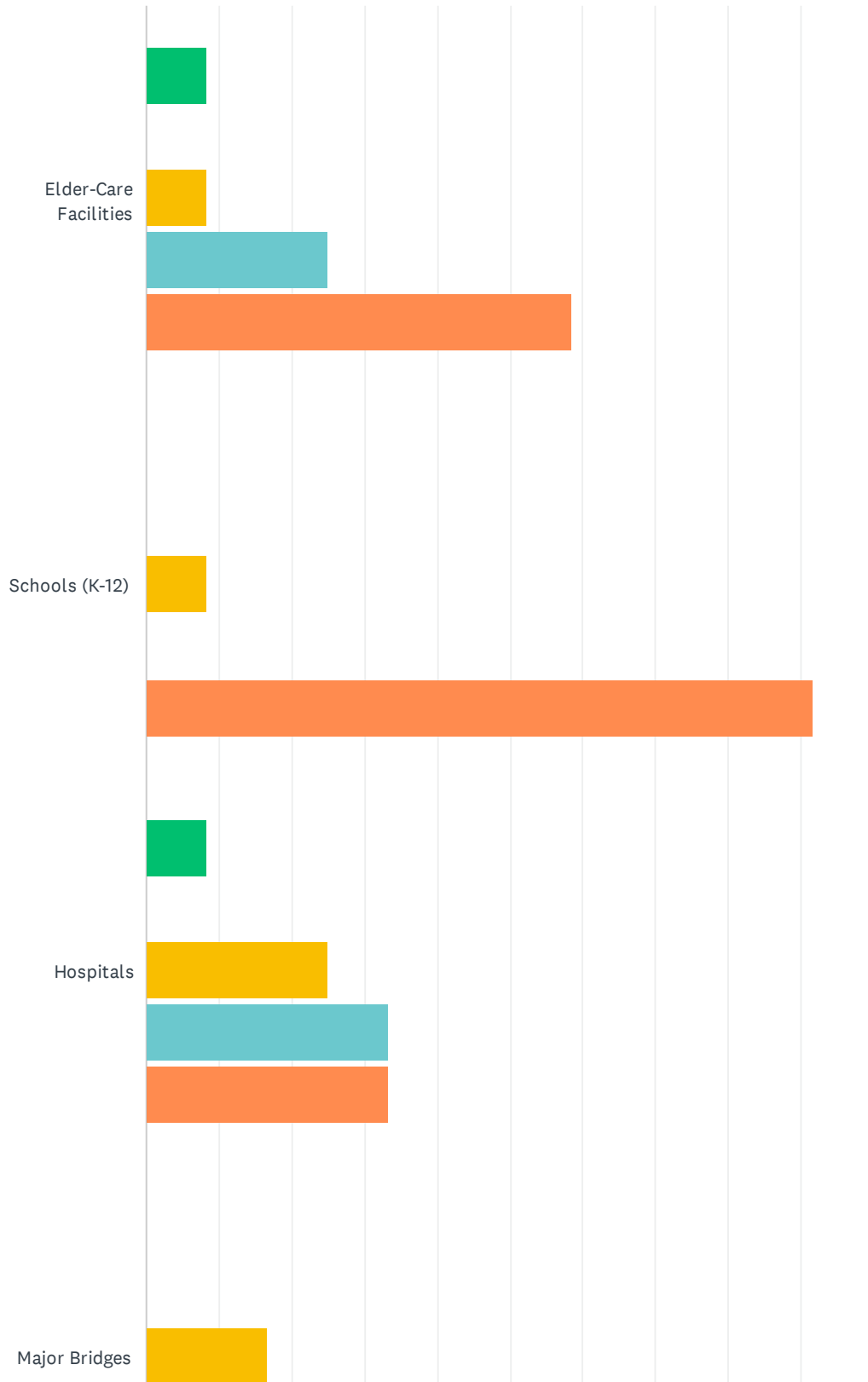
Answered: 12 Skipped: 0



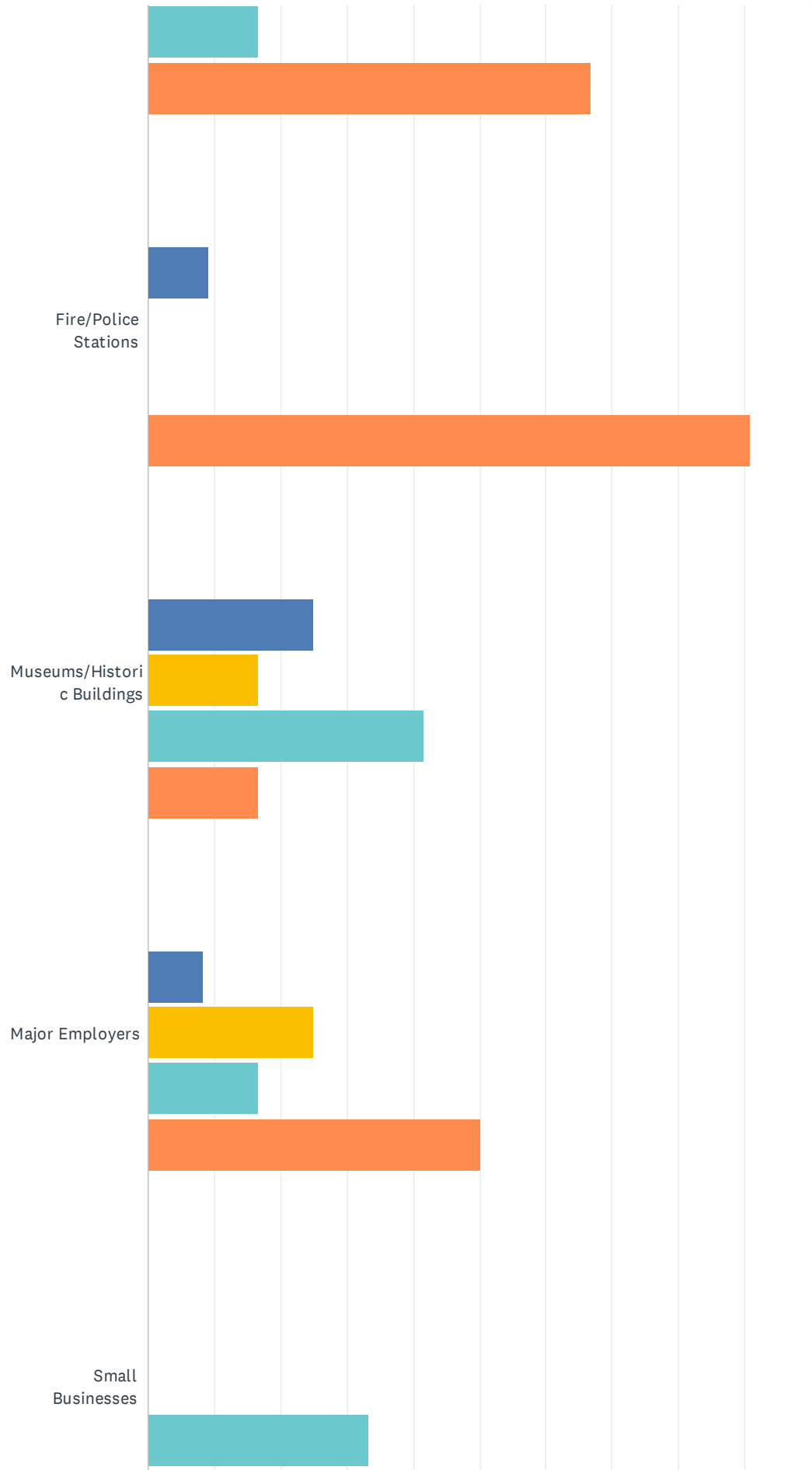
	1	2	3	4	5	6	TOTAL	SCORE
Human: Loss of life and/or injuries	58.33% 7	16.67% 2	8.33% 1	16.67% 2	0.00% 0	0.00% 0	12	5.17
Economic: Business closures and/or job loss	8.33% 1	25.00% 3	25.00% 3	16.67% 2	16.67% 2	8.33% 1	12	3.67
Infrastructure: Damage or loss of bridges, utilities, schools, etc.	8.33% 1	33.33% 4	33.33% 4	16.67% 2	8.33% 1	0.00% 0	12	4.17
Cultural/Historic: Damage or loss of libraries, museums, fairgrounds, etc.	0.00% 0	0.00% 0	8.33% 1	16.67% 2	16.67% 2	58.33% 7	12	1.75
Environmental: Damage or loss of forests, rangeland, waterways, etc.	8.33% 1	16.67% 2	16.67% 2	25.00% 3	33.33% 4	0.00% 0	12	3.42
Governance: Ability to maintain order and/or provide public amenities and services.	16.67% 2	8.33% 1	8.33% 1	8.33% 1	25.00% 3	33.33% 4	12	2.83

Q12 Next we would like to know what specific types of community assets are most important to you.

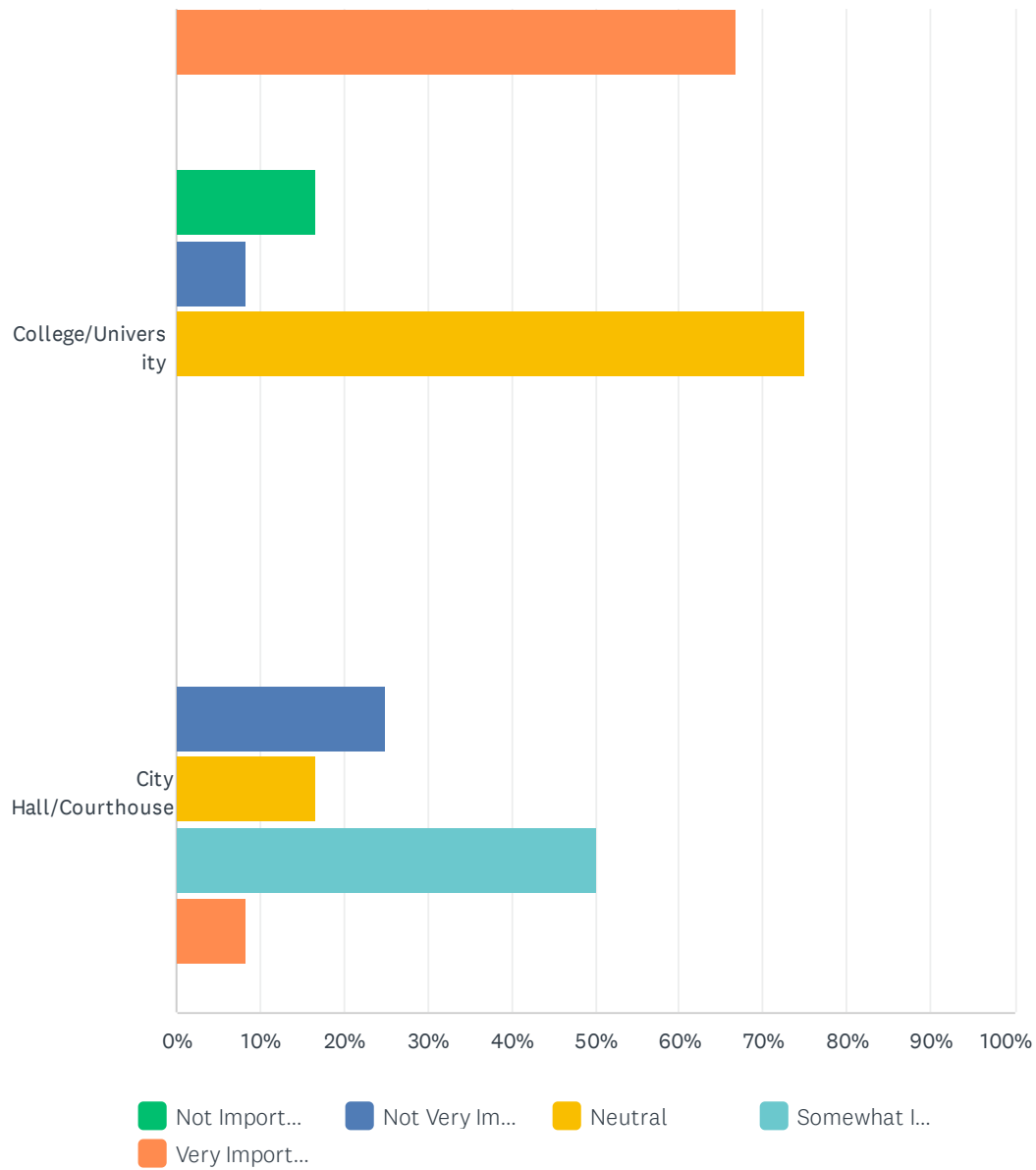
Answered: 12 Skipped: 0



Gilliam County Natural Hazard Survey



Gilliam County Natural Hazard Survey



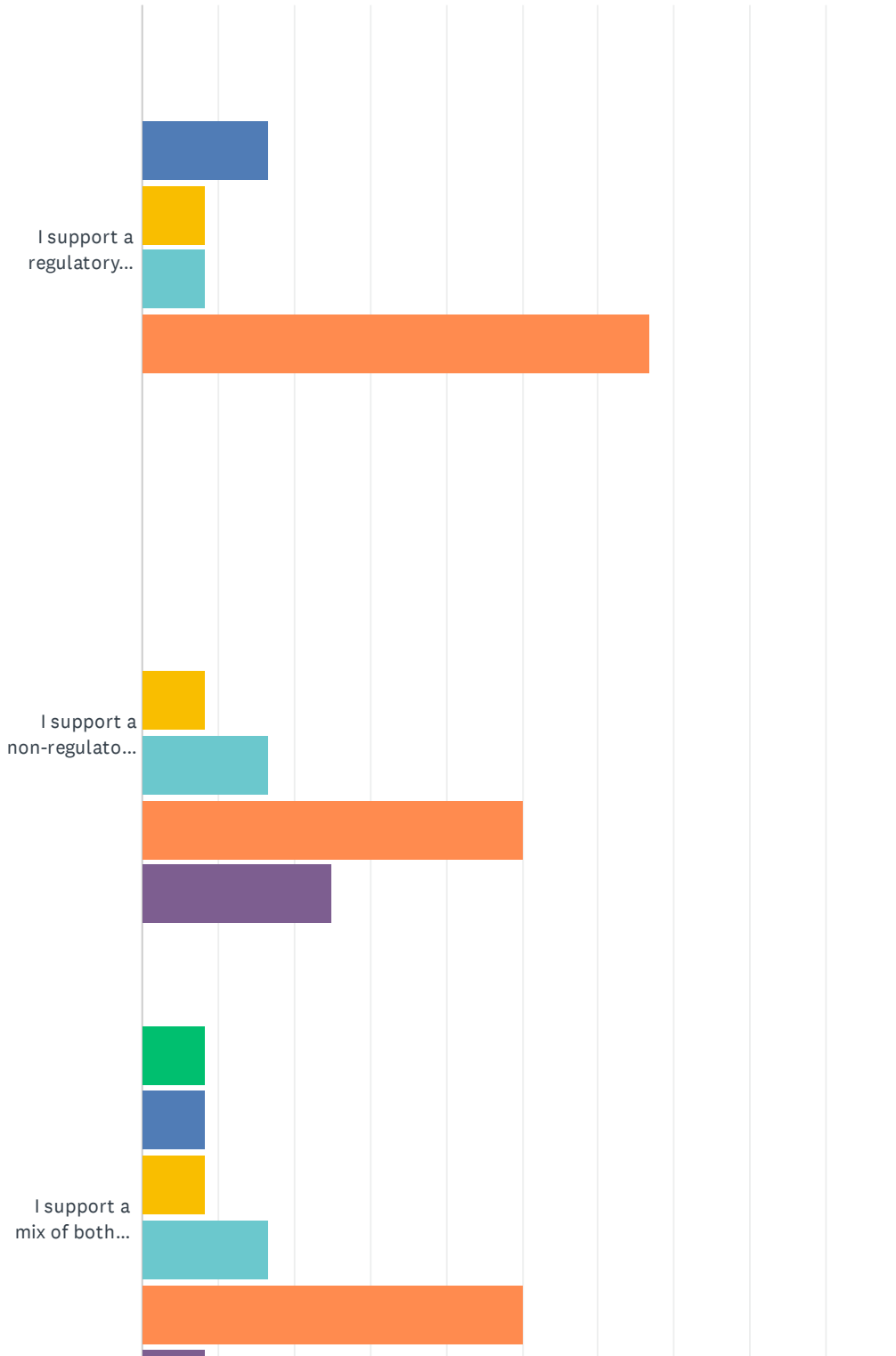
Gilliam County Natural Hazard Survey

	NOT IMPORTANT	NOT VERY IMPORTANT	NEUTRAL	SOMEWHAT IMPORTANT	VERY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Elder-Care Facilities	8.33% 1	0.00% 0	8.33% 1	25.00% 3	58.33% 7	12	4.25
Schools (K-12)	0.00% 0	0.00% 0	8.33% 1	0.00% 0	91.67% 11	12	4.83
Hospitals	8.33% 1	0.00% 0	25.00% 3	33.33% 4	33.33% 4	12	3.83
Major Bridges	0.00% 0	0.00% 0	16.67% 2	16.67% 2	66.67% 8	12	4.50
Fire/Police Stations	0.00% 0	9.09% 1	0.00% 0	0.00% 0	90.91% 10	11	4.73
Museums/Historic Buildings	0.00% 0	25.00% 3	16.67% 2	41.67% 5	16.67% 2	12	3.50
Major Employers	0.00% 0	8.33% 1	25.00% 3	16.67% 2	50.00% 6	12	4.08
Small Businesses	0.00% 0	0.00% 0	0.00% 0	33.33% 4	66.67% 8	12	4.67
College/University	16.67% 2	8.33% 1	75.00% 9	0.00% 0	0.00% 0	12	2.58
City Hall/Courthouse	0.00% 0	25.00% 3	16.67% 2	50.00% 6	8.33% 1	12	3.42

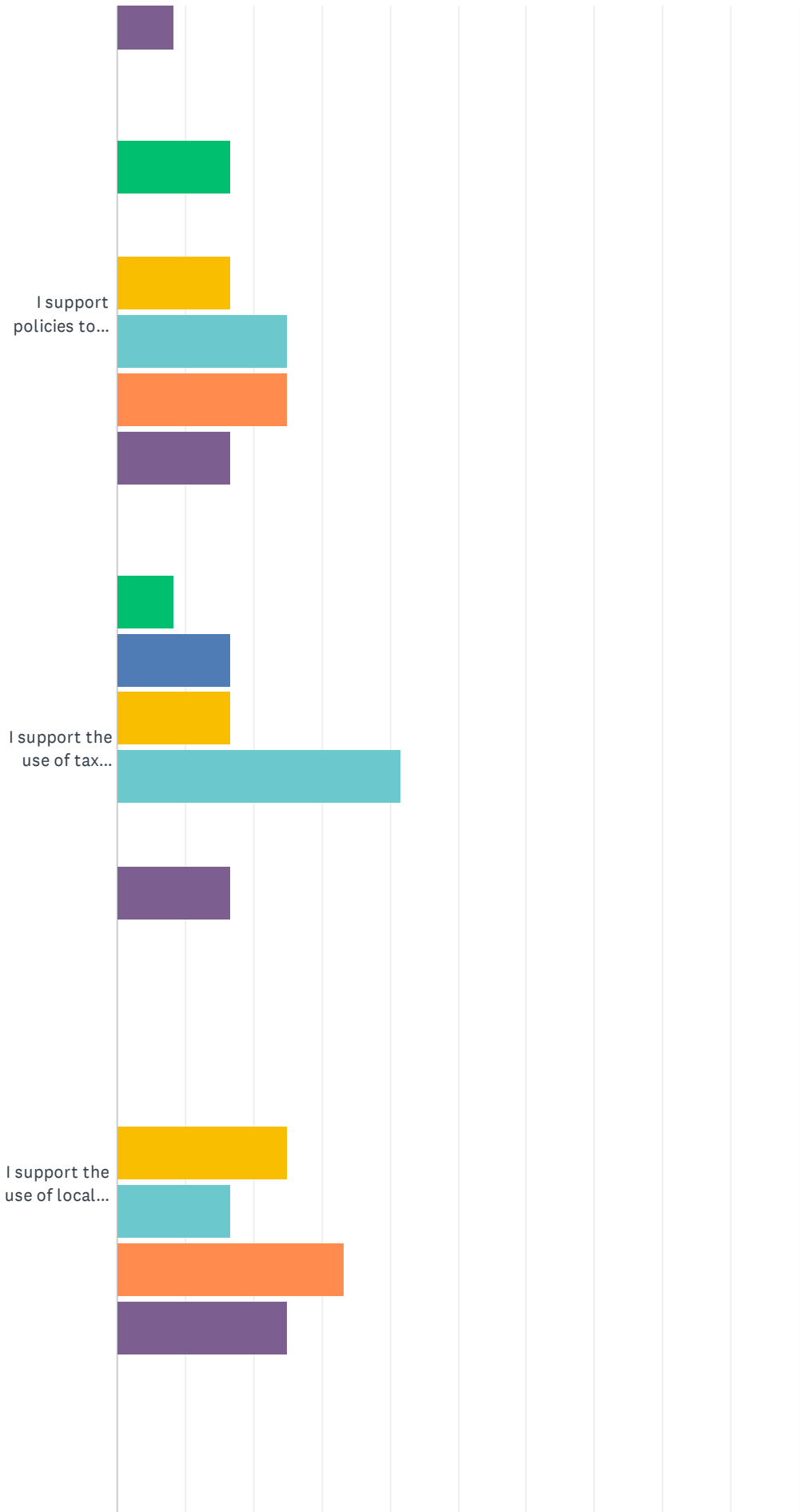
#	OTHER (PLEASE SPECIFY)	DATE
1	My home!	11/2/2023 9:07 AM

Q13 A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory. Please select the option that best represents your opinion of the following strategies to reduce the risk and loss associated with natural disasters.

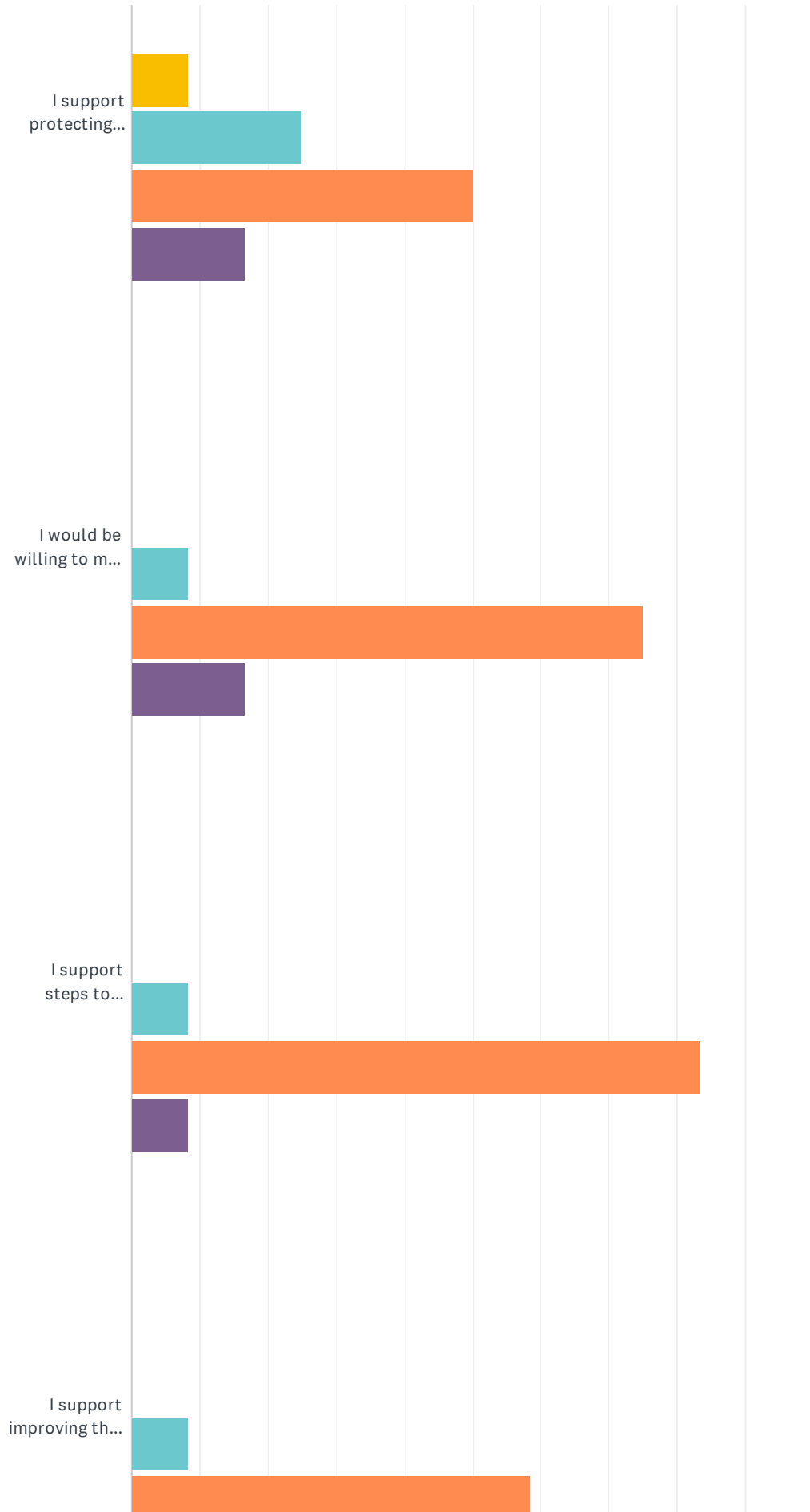
Answered: 12 Skipped: 0



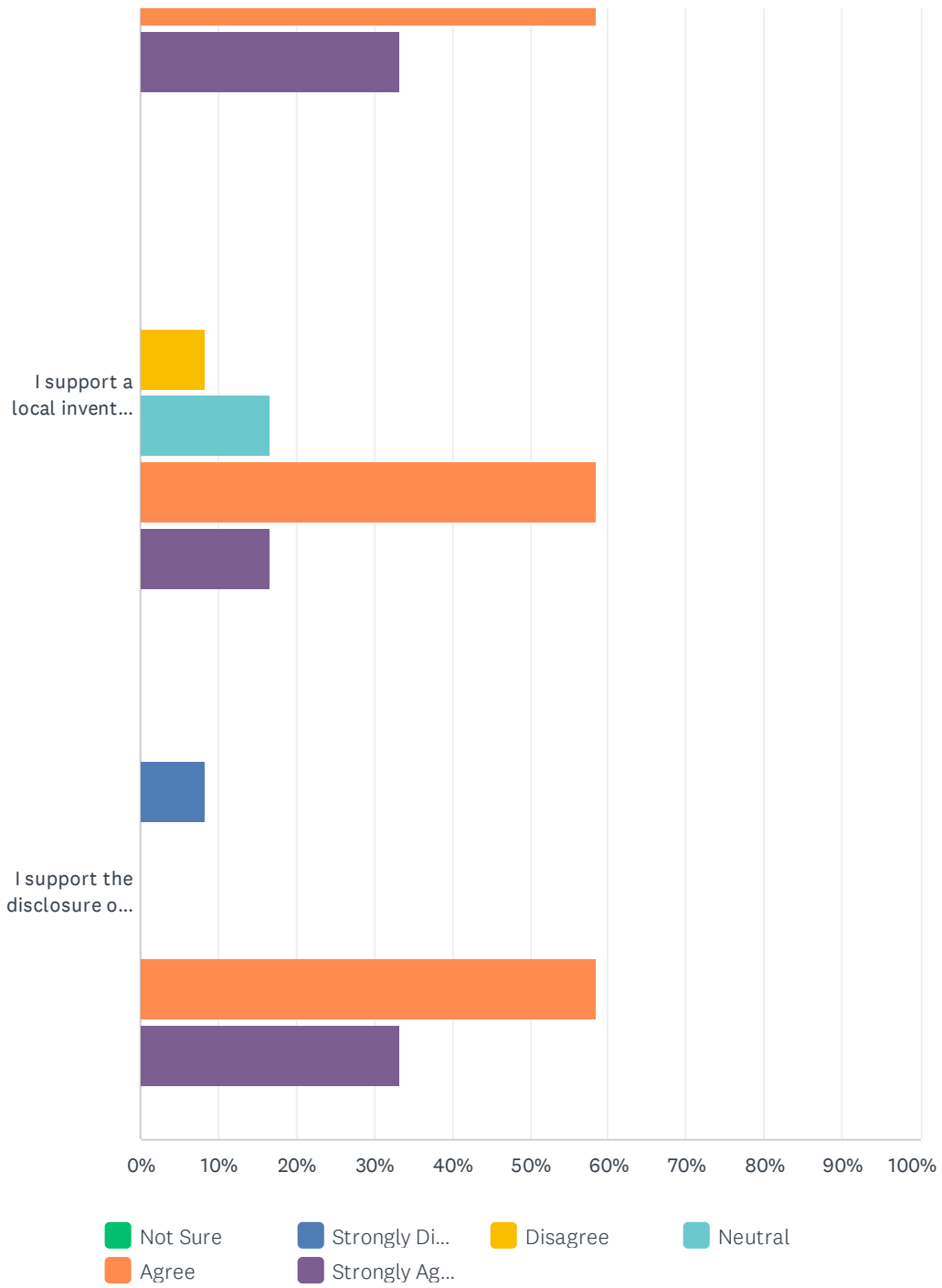
Gilliam County Natural Hazard Survey



Gilliam County Natural Hazard Survey



Gilliam County Natural Hazard Survey

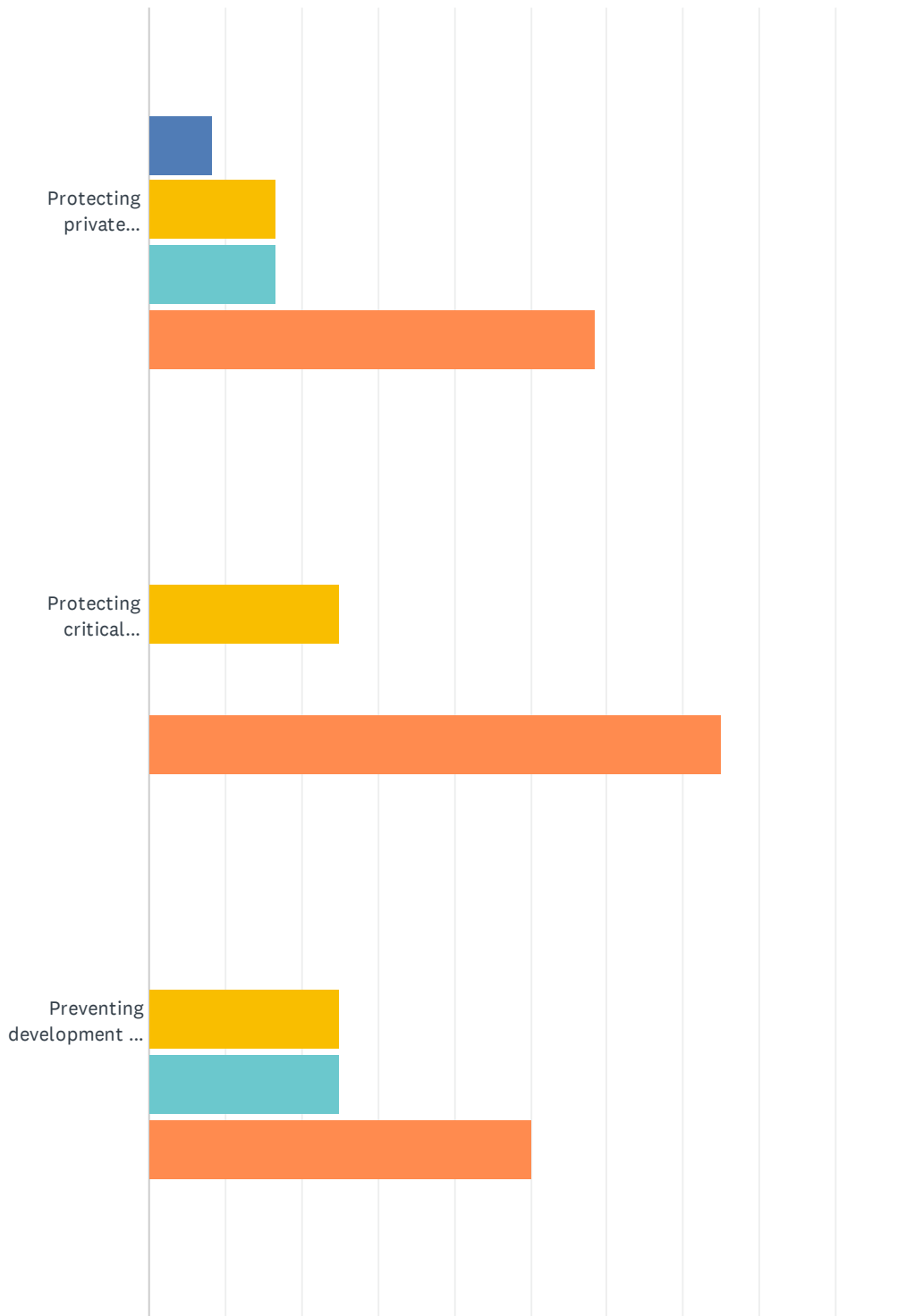


Gilliam County Natural Hazard Survey

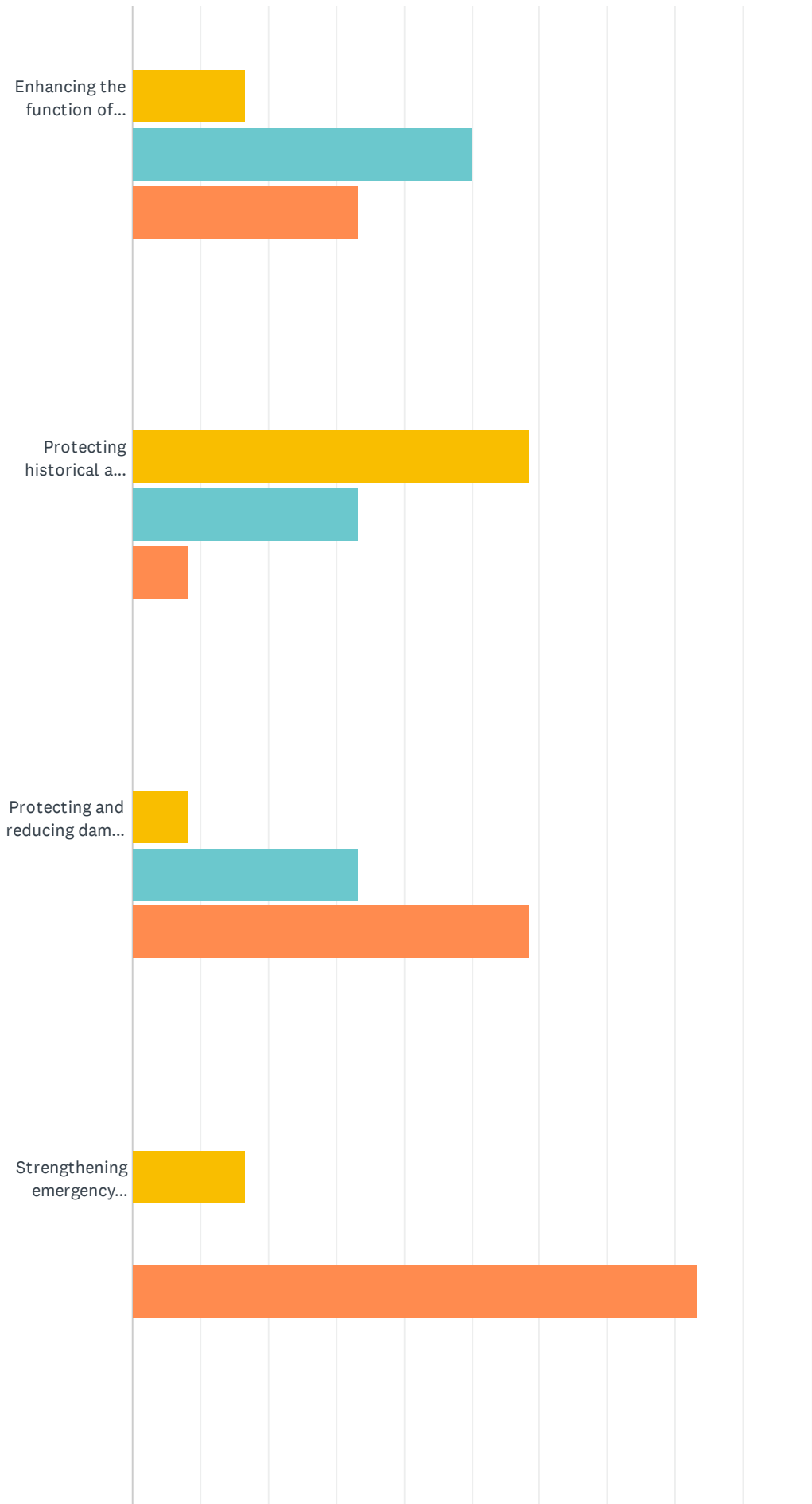
	NOT SURE	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	TOTAL
I support a regulatory approach to reducing risk.	0.00% 0	16.67% 2	8.33% 1	8.33% 1	66.67% 8	0.00% 0	12
I support a non-regulatory approach to reducing risk.	0.00% 0	0.00% 0	8.33% 1	16.67% 2	50.00% 6	25.00% 3	12
I support a mix of both regulatory and non-regulatory approaches to reducing risk.	8.33% 1	8.33% 1	8.33% 1	16.67% 2	50.00% 6	8.33% 1	12
I support policies to prohibit development in areas subject to natural hazards.	16.67% 2	0.00% 0	16.67% 2	25.00% 3	25.00% 3	16.67% 2	12
I support the use of tax dollars (federal and/or local) to compensate landowners for not developing in areas subject to natural hazards.	8.33% 1	16.67% 2	16.67% 2	41.67% 5	0.00% 0	16.67% 2	12
I support the use of local tax dollars to reduce risks and losses from natural disasters.	0.00% 0	0.00% 0	25.00% 3	16.67% 2	33.33% 4	25.00% 3	12
I support protecting historical and cultural structures.	0.00% 0	0.00% 0	8.33% 1	25.00% 3	50.00% 6	16.67% 2	12
I would be willing to make my home more disaster-resilient.	0.00% 0	0.00% 0	0.00% 0	8.33% 1	75.00% 9	16.67% 2	12
I support steps to safeguard the local economy following a disaster event.	0.00% 0	0.00% 0	0.00% 0	8.33% 1	83.33% 10	8.33% 1	12
I support improving the disaster preparedness of local schools.	0.00% 0	0.00% 0	0.00% 0	8.33% 1	58.33% 7	33.33% 4	12
I support a local inventory of at-risk buildings and infrastructure.	0.00% 0	0.00% 0	8.33% 1	16.67% 2	58.33% 7	16.67% 2	12
I support the disclosure of natural hazard risks during real estate transactions.	0.00% 0	8.33% 1	0.00% 0	0.00% 0	58.33% 7	33.33% 4	12

Q14 Natural hazards can have a significant impact on a community but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your county. Please tell us how important each one is to you.

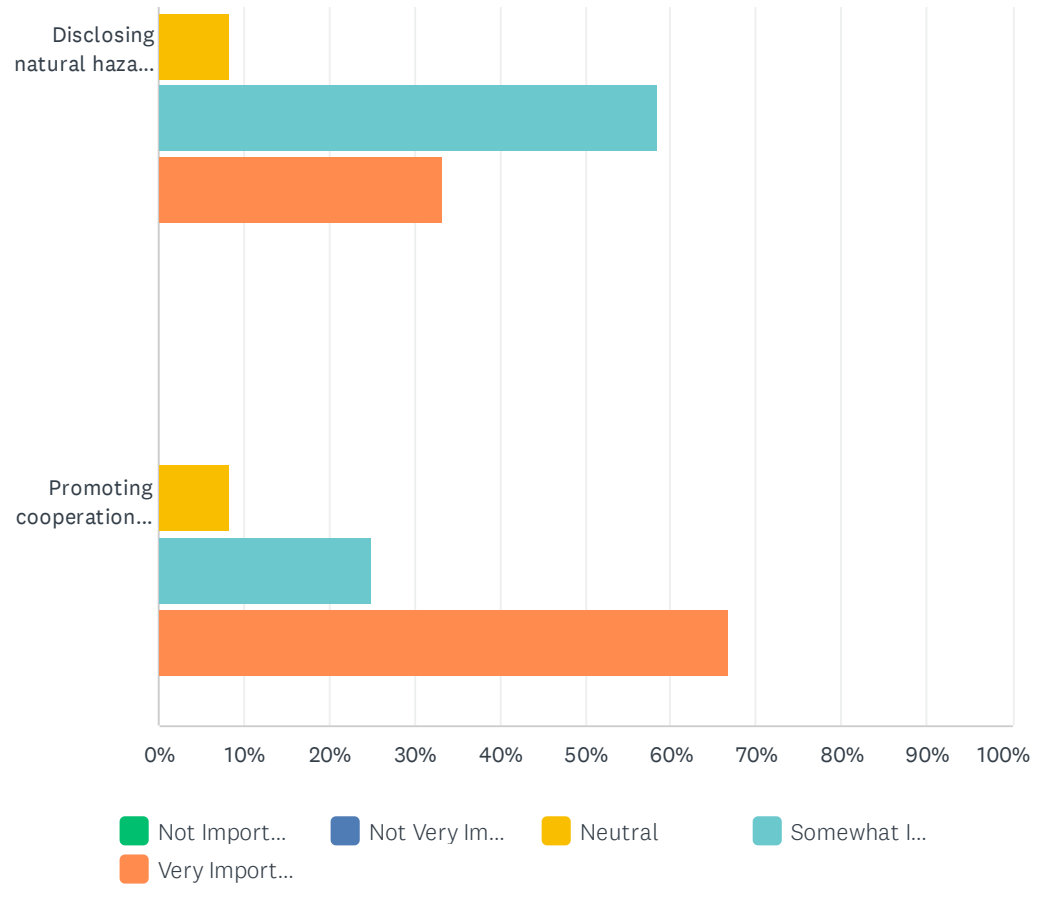
Answered: 12 Skipped: 0



Gilliam County Natural Hazard Survey



Gilliam County Natural Hazard Survey

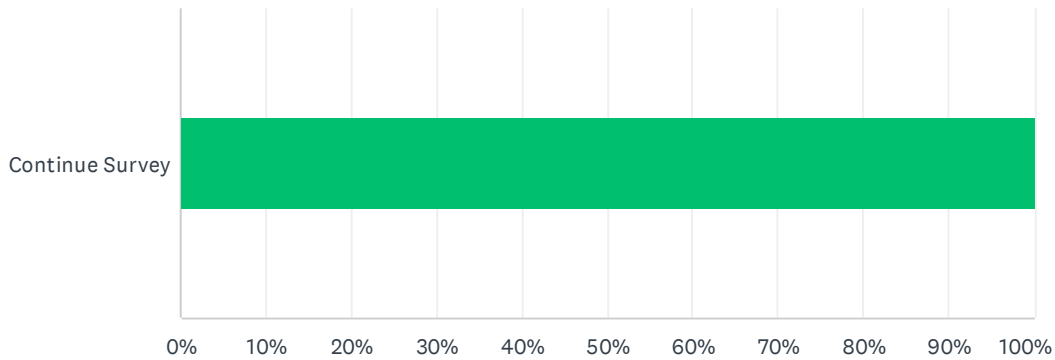


Gilliam County Natural Hazard Survey

	NOT IMPORTANT	NOT VERY IMPORTANT	NEUTRAL	SOMEWHAT IMPORTANT	VERY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Protecting private property.	0.00% 0	8.33% 1	16.67% 2	16.67% 2	58.33% 7	12	4.25
Protecting critical facilities (e.g., transportation networks, hospitals, fire stations).	0.00% 0	0.00% 0	25.00% 3	0.00% 0	75.00% 9	12	4.50
Preventing development in hazard areas.	0.00% 0	0.00% 0	25.00% 3	25.00% 3	50.00% 6	12	4.25
Enhancing the function of natural features (e.g., streams, wetlands).	0.00% 0	0.00% 0	16.67% 2	50.00% 6	33.33% 4	12	4.17
Protecting historical and cultural landmarks.	0.00% 0	0.00% 0	58.33% 7	33.33% 4	8.33% 1	12	3.50
Protecting and reducing damage to utilities.	0.00% 0	0.00% 0	8.33% 1	33.33% 4	58.33% 7	12	4.50
Strengthening emergency services (e.g. police, fire and ambulance).	0.00% 0	0.00% 0	16.67% 2	0.00% 0	83.33% 10	12	4.67
Disclosing natural hazard risks during real estate transactions.	0.00% 0	0.00% 0	8.33% 1	58.33% 7	33.33% 4	12	4.25
Promoting cooperation among public agencies, citizens, non-profits and businesses.	0.00% 0	0.00% 0	8.33% 1	25.00% 3	66.67% 8	12	4.58

Q15 MITIGATION AND PREPAREDNESS ACTIVITIES IN YOUR HOUSEHOLD Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care may be cut off temporarily or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

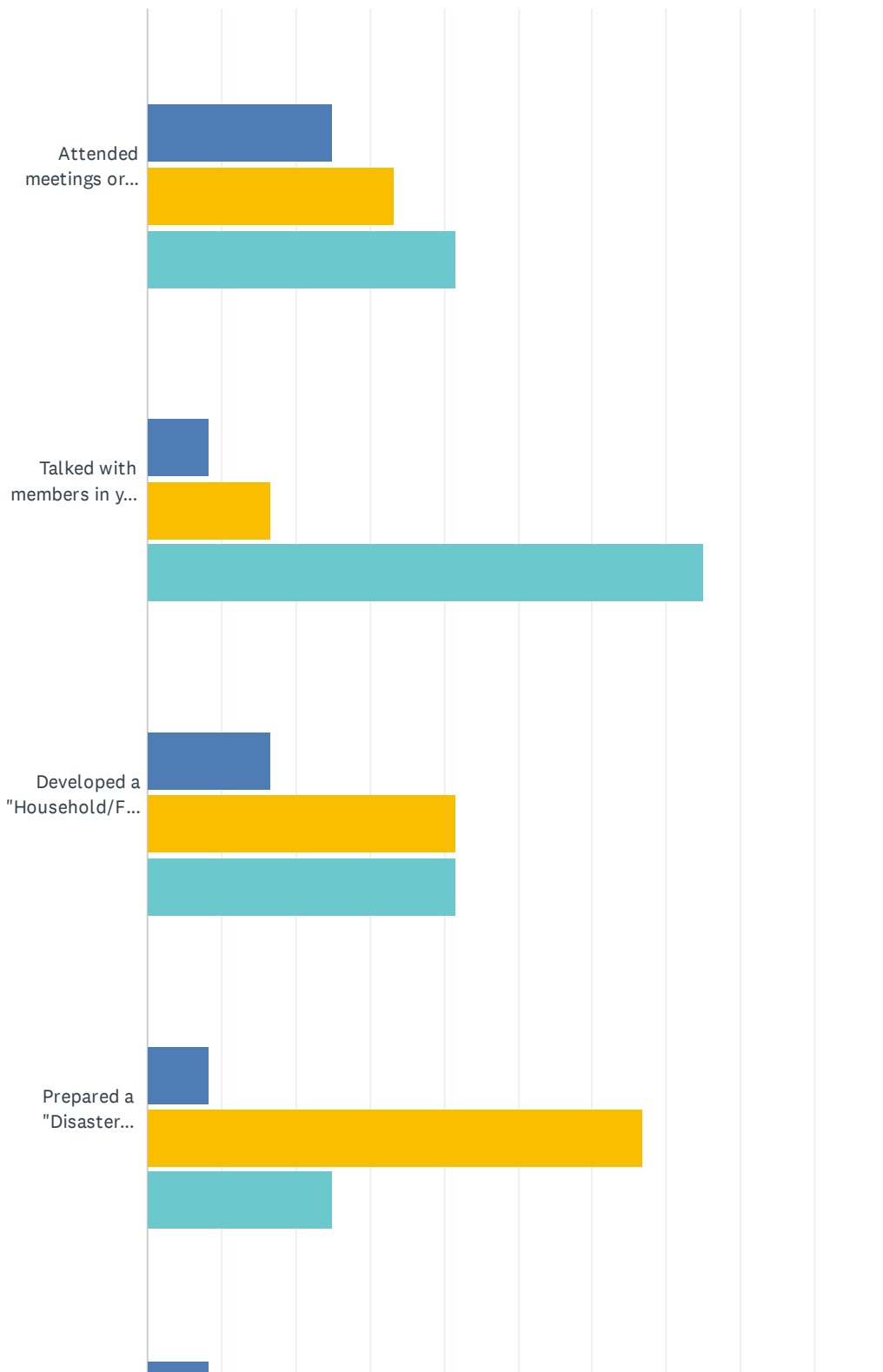
Answered: 12 Skipped: 0



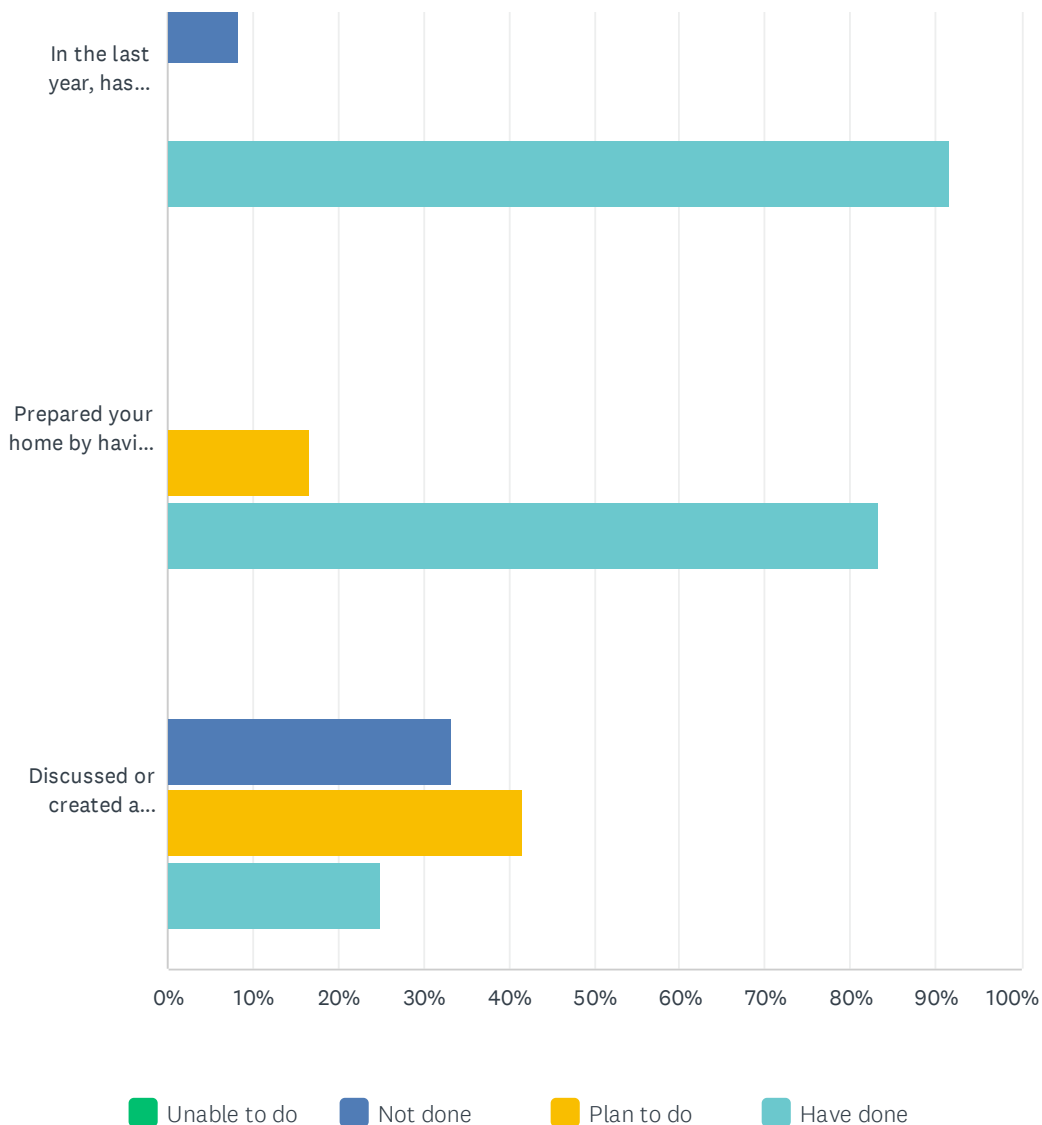
ANSWER CHOICES	RESPONSES
Continue Survey	100.00% 12
TOTAL	12

Q16 In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done or are unable to do.

Answered: 12 Skipped: 0



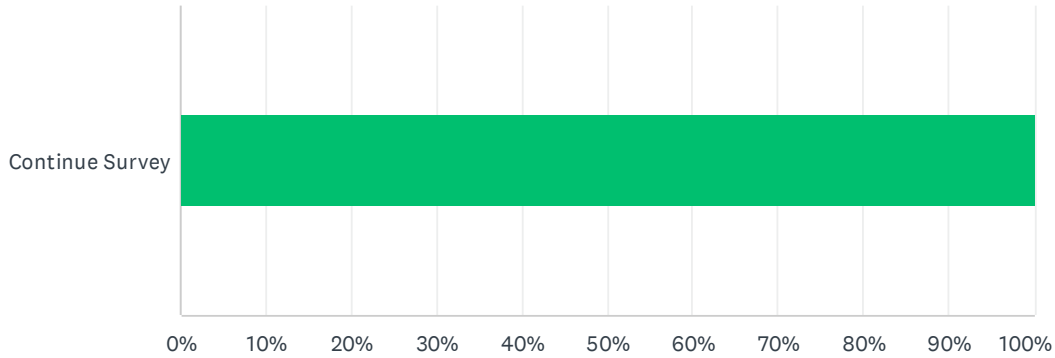
Gilliam County Natural Hazard Survey



	UNABLE TO DO	NOT DONE	PLAN TO DO	HAVE DONE	TOTAL
Attended meetings or received written information on natural disasters or emergency preparedness?	0.00% 0	25.00% 3	33.33% 4	41.67% 5	12
Talked with members in your household about what to do in case of a natural disaster or emergency?	0.00% 0	8.33% 1	16.67% 2	75.00% 9	12
Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	0.00% 0	16.67% 2	41.67% 5	41.67% 5	12
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries or other emergency supplies?)	0.00% 0	8.33% 1	66.67% 8	25.00% 3	12
In the last year, has anyone in your household been trained in First Aid or Cardio-Pulmonary Resuscitation (CPR)?	0.00% 0	8.33% 1	0.00% 0	91.67% 11	12
Prepared your home by having smoke detectors on each level of the house?	0.00% 0	0.00% 0	16.67% 2	83.33% 10	12
Discussed or created a utility shutoff procedure in the event of a natural disaster?	0.00% 0	33.33% 4	41.67% 5	25.00% 3	12

Q17 GENERAL HOUSEHOLD INFORMATION Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only.

Answered: 11 Skipped: 1



ANSWER CHOICES	RESPONSES
Continue Survey	100.00% 11
TOTAL	11

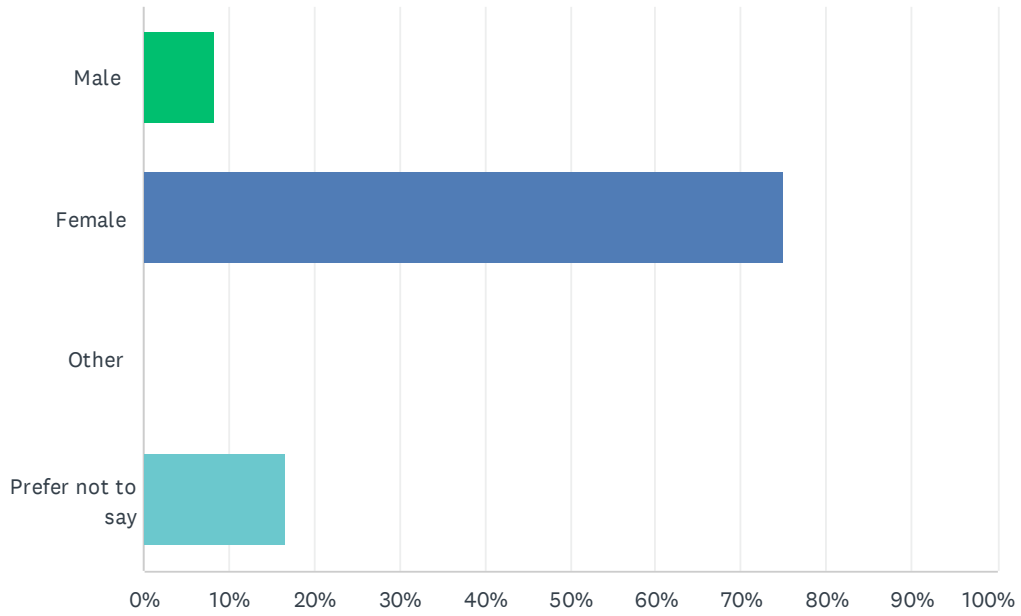
Q18 Please indicate your age

Answered: 11 Skipped: 1

#	RESPONSES	DATE
1	66	2/8/2024 4:07 PM
2	34	2/8/2024 3:47 PM
3	56	1/25/2024 3:12 PM
4	30	1/20/2024 10:49 AM
5	38	1/20/2024 10:46 AM
6	49	1/20/2024 10:25 AM
7	32	11/8/2023 7:35 PM
8	45	11/8/2023 7:03 PM
9	40	11/4/2023 7:37 AM
10	45	11/2/2023 9:07 AM
11	37	10/31/2023 4:48 PM

Q19 Gender

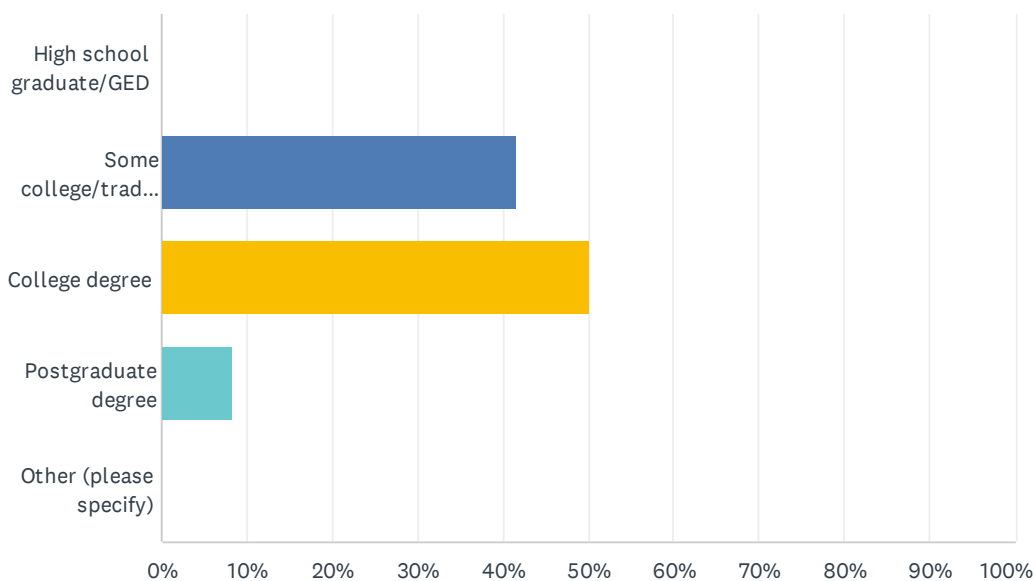
Answered: 12 Skipped: 0



ANSWER CHOICES	RESPONSES	
Male	8.33%	1
Female	75.00%	9
Other	0.00%	0
Prefer not to say	16.67%	2
TOTAL		12

Q20 Please indicate your level of education

Answered: 12 Skipped: 0

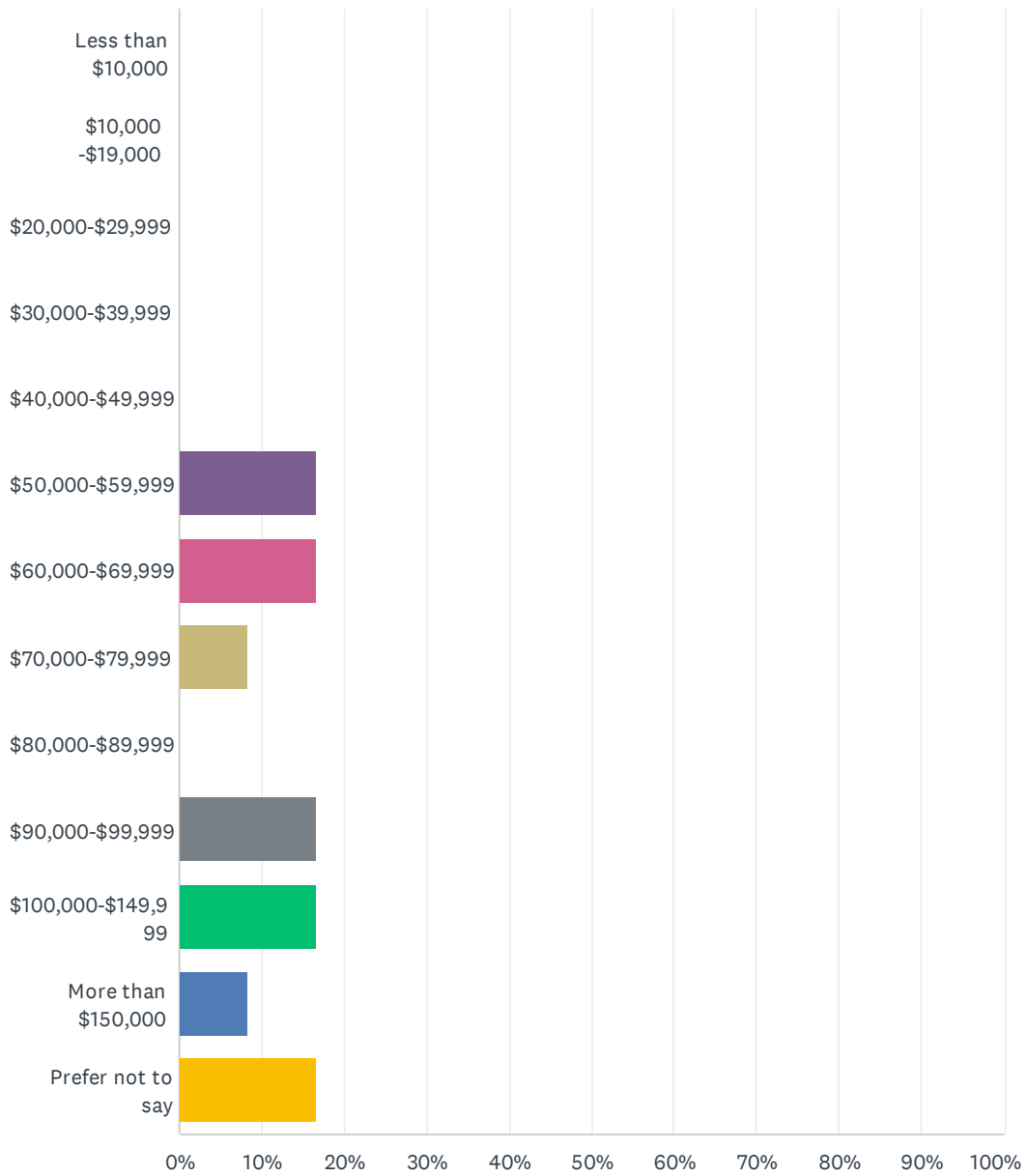


ANSWER CHOICES	RESPONSES	
High school graduate/GED	0.00%	0
Some college/trade school	41.67%	5
College degree	50.00%	6
Postgraduate degree	8.33%	1
Other (please specify)	0.00%	0
TOTAL		12

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q21 What is your total household income?

Answered: 12 Skipped: 0

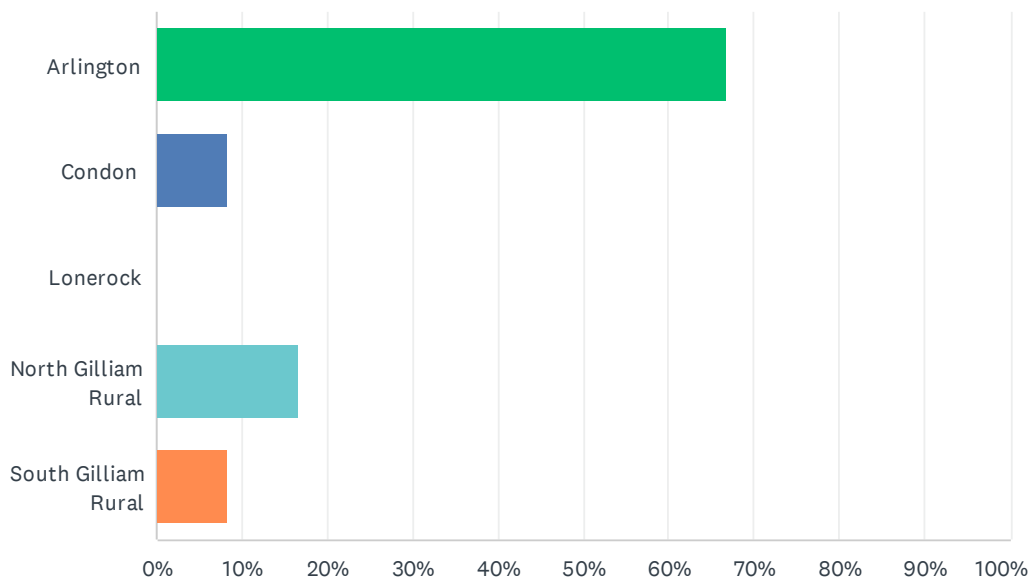


Gilliam County Natural Hazard Survey

ANSWER CHOICES	RESPONSES	
Less than \$10,000	0.00%	0
\$10,000 -\$19,000	0.00%	0
\$20,000-\$29,999	0.00%	0
\$30,000-\$39,999	0.00%	0
\$40,000-\$49,999	0.00%	0
\$50,000-\$59,999	16.67%	2
\$60,000-\$69,999	16.67%	2
\$70,000-\$79,999	8.33%	1
\$80,000-\$89,999	0.00%	0
\$90,000-\$99,999	16.67%	2
\$100,000-\$149,999	16.67%	2
More than \$150,000	8.33%	1
Prefer not to say	16.67%	2
TOTAL		12

Q22 What area of the county do you live in?

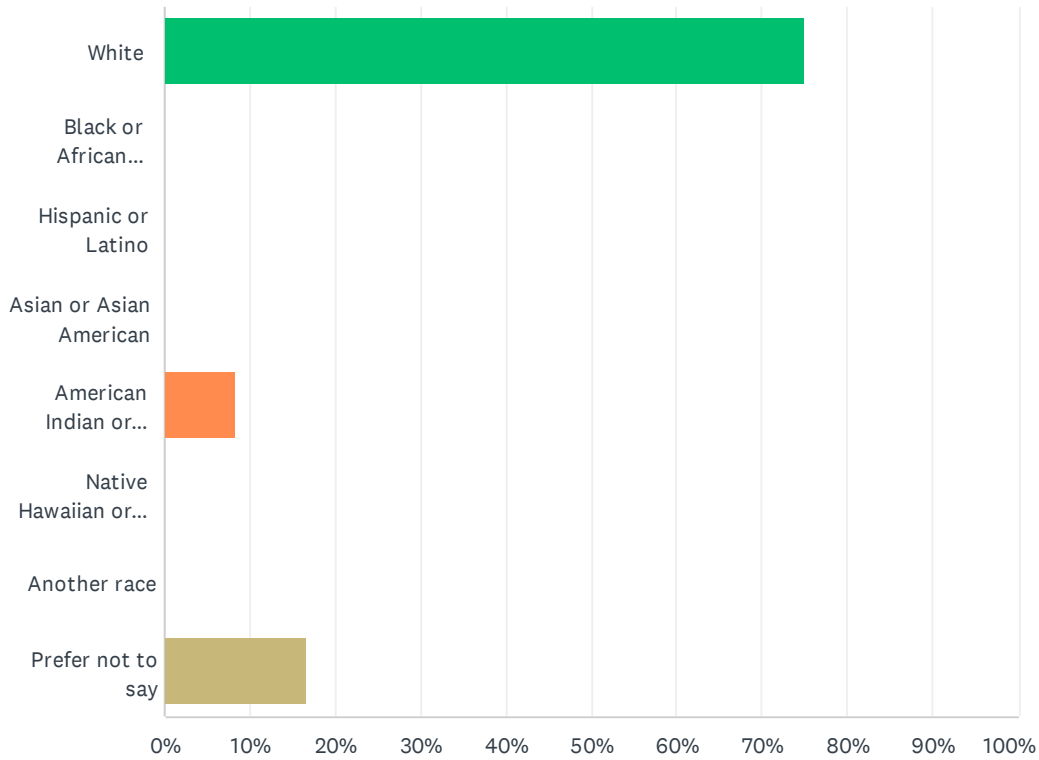
Answered: 12 Skipped: 0



ANSWER CHOICES	RESPONSES	
Arlington	66.67%	8
Condon	8.33%	1
Lonerock	0.00%	0
North Gilliam Rural	16.67%	2
South Gilliam Rural	8.33%	1
TOTAL		12

Q23 Please specify your race

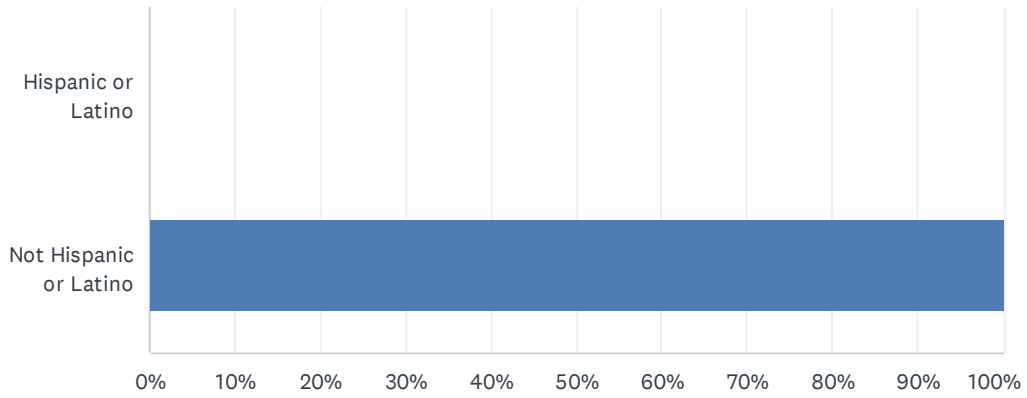
Answered: 12 Skipped: 0



ANSWER CHOICES	RESPONSES	
White	75.00%	9
Black or African American	0.00%	0
Hispanic or Latino	0.00%	0
Asian or Asian American	0.00%	0
American Indian or Alaska Native	8.33%	1
Native Hawaiian or other Pacific Islander	0.00%	0
Another race	0.00%	0
Prefer not to say	16.67%	2
TOTAL		12

Q24 Please specify your ethnicity:

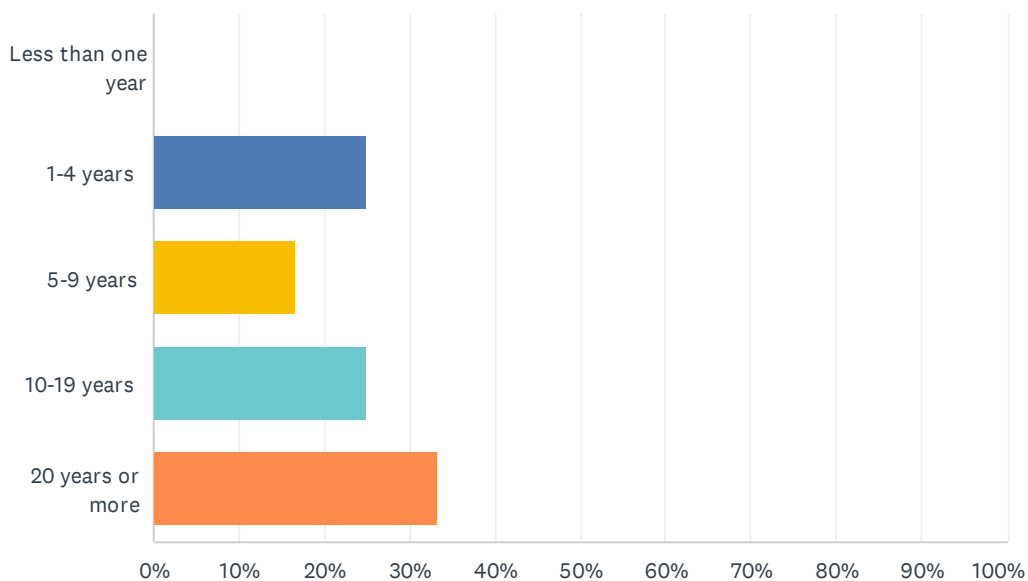
Answered: 11 Skipped: 1



ANSWER CHOICES	RESPONSES
Hispanic or Latino	0.00% 0
Not Hispanic or Latino	100.00% 11
TOTAL	11

Q25 How long have you lived in the County?

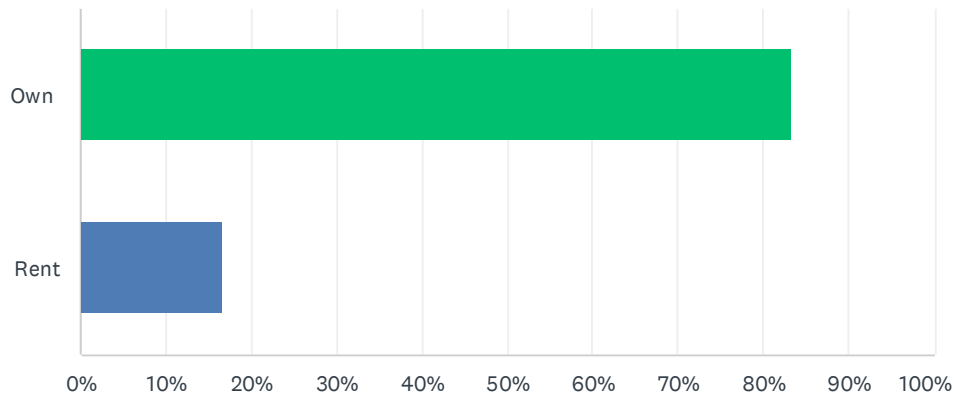
Answered: 12 Skipped: 0



ANSWER CHOICES	RESPONSES	
Less than one year	0.00%	0
1-4 years	25.00%	3
5-9 years	16.67%	2
10-19 years	25.00%	3
20 years or more	33.33%	4
TOTAL		12

Q26 Do you own or rent your home?

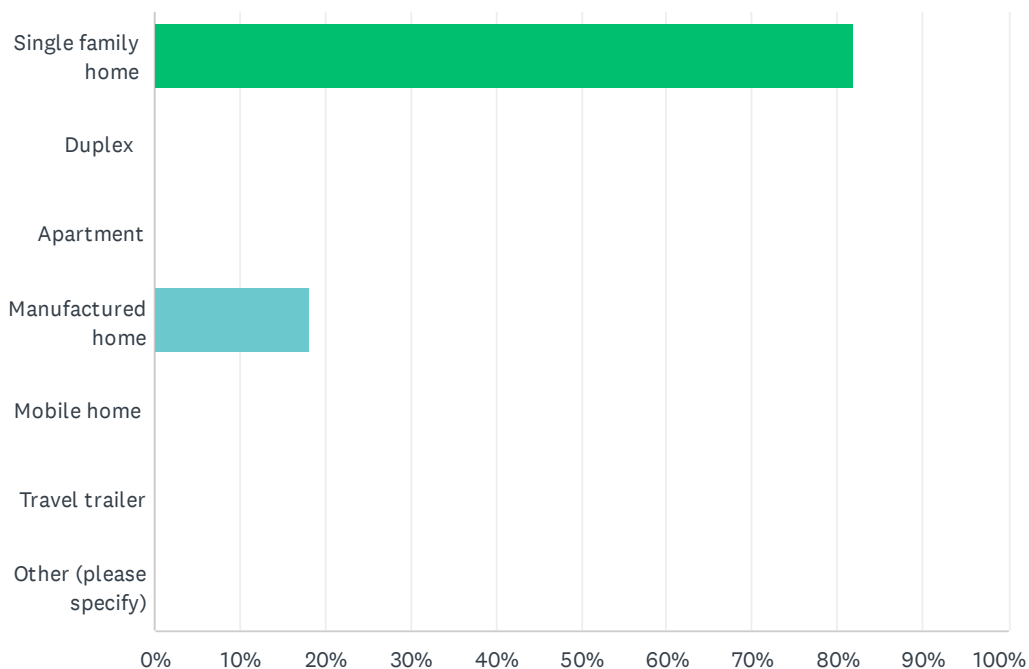
Answered: 12 Skipped: 0



ANSWER CHOICES	RESPONSES	
Own	83.33%	10
Rent	16.67%	2
TOTAL		12

Q27 Do you own/rent a:

Answered: 11 Skipped: 1



ANSWER CHOICES	RESPONSES	
Single family home	81.82%	9
Duplex	0.00%	0
Apartment	0.00%	0
Manufactured home	18.18%	2
Mobile home	0.00%	0
Travel trailer	0.00%	0
Other (please specify)	0.00%	0
TOTAL		11

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q28 Please feel free to provide any additional comments in the space below:

Answered: 3 Skipped: 9

#	RESPONSES	DATE
1	The city of Arlington public works needs to be plowing during a snow storm. Not waiting until the snow has accumulated. And hire someone who can plow all roads. All roads in Arlington can be plowed with the right setup.	1/20/2024 10:49 AM
2	Communication during previous event with water supply and ice/snow needs major improvement. Community was relying on Facebook to share information or city site. Need a much more proactive approach for those that have no power, don't use Facebook or internet. People really had to scramble for information.	1/20/2024 10:25 AM
3	Thank you for your hard work on this survey and research.	11/4/2023 7:37 AM

APPENDIX F: GRANT PROGRAMS

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 utilized by local jurisdictions in Oregon. Because grant programs often change, it is important to periodically review available funding sources for current guidelines and program descriptions.

Post-Disaster Federal Programs

Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) provides grants to state, local tribal and territorial governments so they can develop hazard mitigation plans and rebuild in a way that reduces or mitigates, future disaster losses in their communities. This grant is only available after a presidentially declared disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. All state, local, tribal and territorial governments must develop and adopt hazard mitigation plans to receive funding for a hazard mitigation project application.

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

Hazard Mitigation Grant Program Post Fire

The HMPG Post Fire program provides funding to help communities implement hazard mitigation measures focused on reducing the risk of harm from wildfire. HMPG Post Fire funding is authorized under Sections 404 and 420 of the Stafford Act, and provides hazard mitigation grant funding to SLTT governments in areas receiving a Fire Management Assistance Grant (FMAG) declaration.

<https://www.fema.gov/grants/mitigation/post-fire>

Disaster Loan Assistance

The U.S. Small Business Administration administers a disaster loan program with four different types of low-interest disaster loans available to homeowners and small businesses impacted by declared natural and other disasters. Physical damage loans to cover repairs and replacement of physical assets damaged in a declared disaster, mitigation assistance to make improvements to eliminated future damage, economic injury disaster loans to cover small business operating expenses after a declared disaster and military reservists loan to help eligible small business with operating expenses to make up for employees on active duty leave. <http://www.sba.gov/category/navigation-structure/loans-grants/small-business-loans/disaster-loans>

Flood Mitigation Assistance Swift Current

The Swift Current effort provides funding to mitigate repetitively and substantially flood-damaged buildings insured through the NFIP after a presidentially declared flood-related disaster to reduce risk against future flood damage. Funds will be made available to states, territories and federally recognized tribal government that receive a major disaster declaration following a flood-related disaster event and meet all other eligibility criteria. Examples of projects eligible for funding include property acquisition and demolition, elevation and relocation.

<https://www.fema.gov/grants/mitigation/flood-mitigation-assistance/swift-current>

Pre-Disaster Federal Programs

Building Resilient Infrastructure and Communities

FEMA's Building Resilient Infrastructure and Communities (BRIC) annual grant program supports SLTTs as they implement hazard mitigation projects to reduce the risks from disasters and natural hazards. The program is authorized by the Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

The BRIC program aims to categorically shift the federal focus away from reactive disaster spending and toward proactive investment in community resilience. It is a competitive grant program and applicants can apply on an annual basis.

The BRIC program also encourages communities to participate in the BRIC Direct Technical Assistance (BRIC DTA) initiative. BRIC DTA provides tailored support to communities that may not have the resources to begin climate resilience planning and project solution design on their own.

BRIC has primarily replaced the PDM program as a funding mechanism for governments.

<https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities>

Flood Mitigation Assistance Program

Flood Mitigation Assistance (FMA) grants provide funding to states, local communities, tribes and territories to reduce or eliminate the risk of repetitive flood damage to buildings insured under the National Flood Insurance Program (NFIP). The Program is authorized by Section 1366 of the National Flood Insurance Act.

FEMA distributes funds annually to develop community or individual flood mitigation projects. These grants address community flood risk for the purpose of reducing National Flood Insurance Program flood claim payments and to mitigate the risk of flooding to individual flood insured structures. As a requirement for the Flood Mitigation Assistance program, all subapplicants must be participating and in good standing with the NFIP.

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

Safeguarding Tomorrow Revolving Loan Fund Program

The Safeguarding Tomorrow through Ongoing Risk Mitigation (STORM) Act became law on Jan 1, 2021 and authorizes FEMA to provide capitalization grants to states, eligible federally recognized tribes, territories and the District of Columbia to establish revolving loan funds that provide hazard mitigation assistance for local governments to reduce risks from natural hazards and disasters. Awarded grant funding will be used by an applicant to administer its revolving loan fund and provide direct loans to local governments based on its unique mitigation needs and priorities.

<https://www.fema.gov/fact-sheet/summary-fema-hazard-mitigation-assistance-hma-programs>

Non-FEMA Federal Mitigation Funding

United States Forest Service Community Wildfire Defense Grants

The CWDG is intended to help at-risk local communities and tribes plan for and reduce the risk to wildfire, including mitigation activities. The program prioritizes at-risk communities in an area identified as having high or very high wildfire hazard potential, are low-income, or have been impacted by a severe disaster that affects the risk of wildfire. <https://www.fs.usda.gov/managing-land/fire/grants>

US Fish and Wildlife Service Wildland Urban Interface Community Assistance Grants

This grant is to implement the National Cohesive Wildland Fire Management Strategy and assist communities at risk from catastrophic wildland fires by providing assistance in the following areas: implementation of community programs that develop and enhance local capability in the areas of risk assessment and planning, training, mitigation activities and community and homeowner education and action, planning and implementation of fuels management reduction activities aimed at mitigation the threat of catastrophic wildfire to communities and natural resources in high risk areas. www.grants.gov

For Oregon Department of Emergency Management (ODEM) grant guidance on Federal Hazard Mitigation Assistance, visit: <https://www.oregon.gov/OEM/emresources/Grants/Pages/HMA.aspx> For information on Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities Grant Program, and Flood Mitigation Assistance Program, contact the Oregon State Hazard Mitigation Officer at Office of Emergency Management at 503-798-7240.

State Programs

Seismic Rehabilitation Grant Program

The Seismic Rehabilitation Grant Program (SRGP) provides state funds to strengthen public schools and emergency services buildings so they will be less damaged during an earthquake. Reducing property damage, injuries, and casualties caused by earthquakes is the goal of the SRGP. <https://www.oregon.gov/biz/programs/srgp/pages/default.aspx>

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/>

Hazard ID and Mapping

National Flood Insurance Program: Flood Mapping; FEMA

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

National Map: Orthoimagery, DOI – USGS

Develops topographic quadrangles for use in mapping of flood and other hazards. <https://nationalmap.gov/ortho.html>

National Cooperative Geologic Mapping Program, DOI-USGS

The NCGMP is the primary source of funds for the production of geologic maps in the United States and provides accurate geologic maps and three-dimensional framework models that improve life, the economy and mitigate natural hazards.

<http://ncgmp.usgs.gov/standards.html>

Soil Survey, USDA-NRCS

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

Project Support

Coastal Zone Management Program, NOAA

Provides grants for planning and implementation of non-structural coastal flood and hurricane hazard mitigation projects and coastal wetlands restoration. <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. https://www.hud.gov/program_offices/comm_planning/communitydevelopment

National Cohesive Wildland Fire Management Strategy (DOI – USDA)

The Nation Cohesive Strategy is a collaborative process to seek national, all-lands, solutions to wildland fire management issues focusing on three goals: restore and maintain resilient landscapes, create fire adapted communities, and safe and effective wildfire response <http://www.forestsandrangelands.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 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>

Food and Nutrition Service (FNS) disaster assistance

FNS coordinates with state, territory, tribal and voluntary organizations to provide nutrition assistance to families and individuals affected by a disaster or emergency. <https://www.fns.usda.gov/da/disaster-assistance>

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 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 Non-profit 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.

https://www.hud.gov/program_offices/comm_planning/home

HUD Disaster Recovery Funds (CDBR-DR)

HUD may provide flexible Community Development Block Grant Disaster Recovery (CDBG-DR) funds to help cities, counties and states recover from Presidentially declared disasters.

https://www.hud.gov/disaster_resources

Emergency Management Performance Grants, FEMA

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

Partners for Fish and Wildlife, DOI – FWS

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

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

North American Wetland Conservation Fund, DOI-FWS

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

<https://www.fws.gov/service/north-american-wetlands-conservation-act-nawca-grants-us-standard>

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.

<https://www.nps.gov/orgs/1508/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>

Appendix G: Climate Change Influence on Natural Hazards: Overview and Gilliam County Projections

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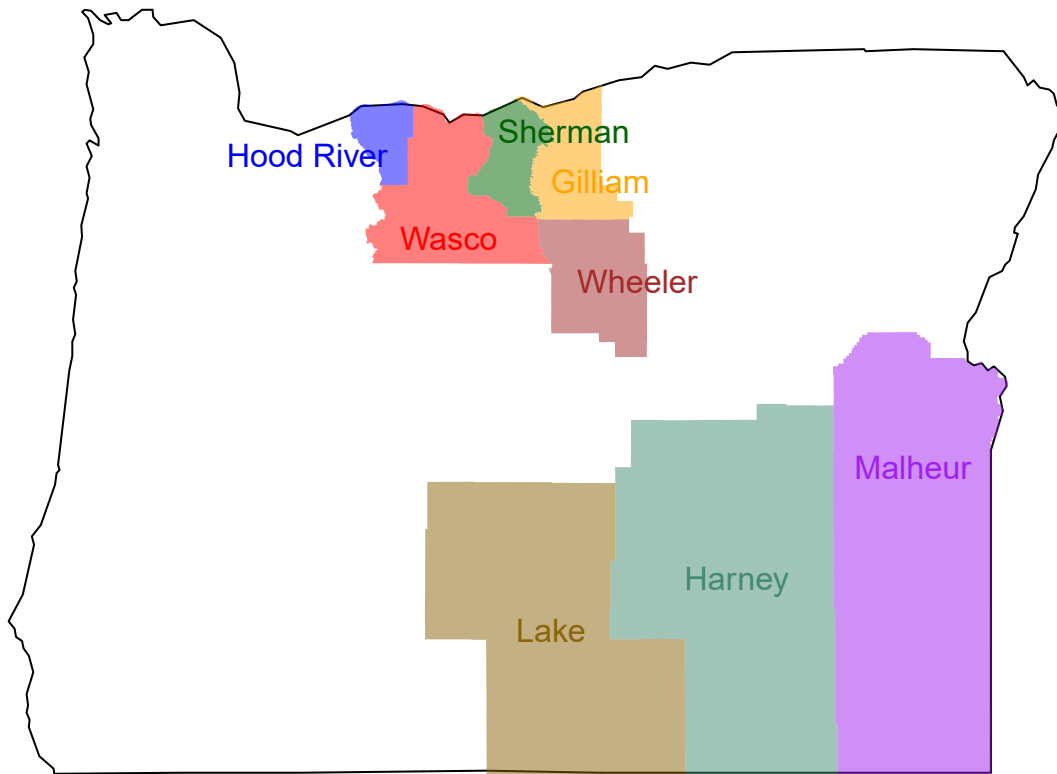
Climate Change Influence on Natural Hazards in Eight Oregon Counties

Overview of County Reports

August 2018

Prepared by
Oregon Climate Change Research Institute


www.occri.net





Oregon Department of
Land Conservation
and Development


Introduction. The Earth’s climate is warming largely due to increasing amounts of greenhouse gas emissions worldwide. 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, and air quality. Supported by the Oregon Department of Land Conservation and Development’s Pre-Disaster Mitigation grants, the Oregon Climate Change Research Institute provided analyses and summaries of how climate change is expected to influence natural hazards for eight counties in Oregon.

Hood River, Wasco, Sherman, Gilliam, Wheeler, Malheur, Harney, and Lake Counties each received a report, *Future Climate Projections*, describing 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 2050s (2040–2069 average) compared to the 1971–2000 average historical baseline. This overview presents a summary of projected direction of changes in climate change-related risk of natural hazard occurrence based on projections only for the 2050s compared to the historical baseline (Table 1). Projections for the 2020s are similar to those for the 2050s, but of smaller magnitude, and can be found in the county reports.

 **Heat Waves.** Across all eight counties, extreme heat events are expected to increase in frequency, duration, and intensity due to continued warming temperatures. Under the higher emissions scenario, projected increases in the number of days with temperature at or above 90°F range on average from 12 additional days in Hood River County to 38 additional days in Malheur County (Figure 1) by the 2050s compared to the historical baseline.

 **Cold Waves.** Across all eight counties, cold extremes are still expected to occur from time to time, but with much less frequency and intensity as the climate warms. Under the higher emissions scenario, projected decreases in the number of days with temperature at or below freezing range on average from 7 fewer days in Sherman and Gilliam Counties to 14 fewer days in Hood River County by the 2050s compared to the historical baseline.

 **Heavy Rains.** As the atmosphere warms and is able to hold more water vapor, the frequency and intensity of extreme precipitation events is expected to increase. Across all eight counties, the amount of precipitation on the wettest day of the year is expected to increase in the future. Under the higher emissions scenario, projected increases range on average from 14% more precipitation on the wettest day in Wheeler County to 20% more precipitation in Sherman County by the 2050s compared to the historical baseline.

 **River Flooding.** Mid- to low-elevation tributaries, such as Hood River and John Day River, that are near freezing level in winter, receiving a mix of rain and snow, may experience an increase in winter flood risk due to warmer winter temperatures causing precipitation to fall more as rain and less as snow, as well as more intense precipitation events. The flood magnitude of the 10-year (10% exceedance probability) single-day flood event is projected to increase on the Snake, John Day, and

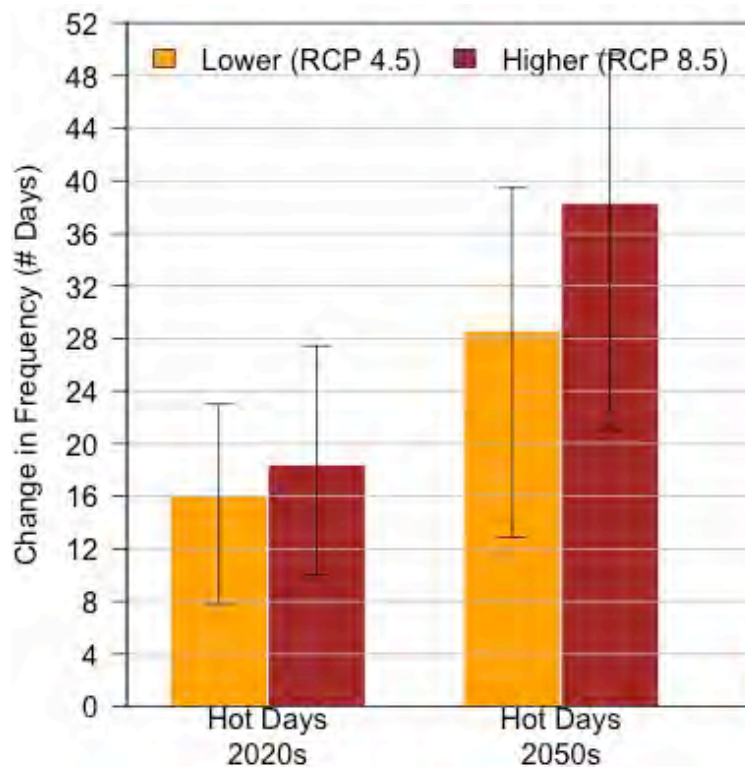


Figure 1 Projected future change in the number of hot days for Malheur County from the historical baseline for the 2020s and 2050s under a lower and higher emissions scenario. The bars and whiskers display the mean and range, respectively, of changes across 20 global climate models. Hot days are defined as days with maximum temperature of at least 90°F.

Owyhee Rivers, but shows little change on the Columbia main stem by the 2050s compared to the historical baseline.

Drought. Counties reliant on spring and summer snowpack to supply summer water demands are projected to experience greater frequency of low spring snowpack years. Drought conditions represented by low summer soil moisture and low summer runoff are projected to become more frequent in Hood River (Figure 2), Wasco, and Wheeler Counties, but may become less frequent in the other five counties by the 2050s compared to the historical baseline.

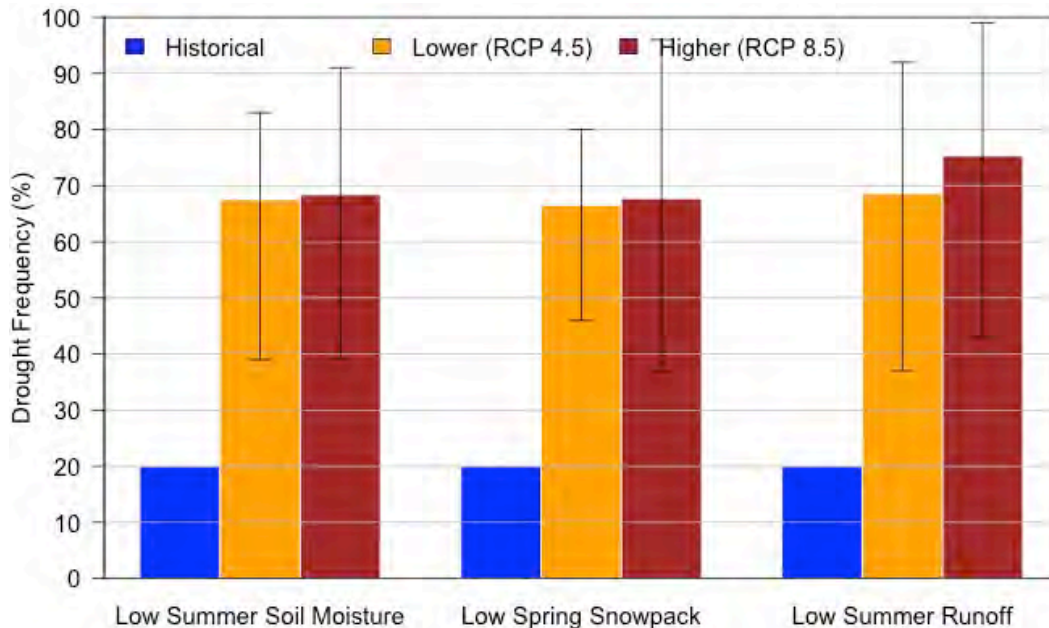


Figure 2 Frequency of the historical baseline 1-in-5 year event (by definition 20% frequency) of low summer soil moisture, low spring snowpack, and low summer runoff projected for the 2050s for Hood River County under lower and higher emissions scenarios. The bar and whiskers depict the mean and range across ten global climate models.

Wildfire. Across all eight counties, wildfire risk, as expressed through the frequency of very high fire danger days, is projected to increase under future climate change. Under the higher emissions scenario, projected increases in the frequency of very high fire danger days range on average from 38% greater frequency in Lake and Wasco Counties to 41% greater frequency in Gilliam County by the 2050s compared to the historical baseline.

Poor Air Quality. Under future climate change, the risk of wildfire smoke exposure is projected to increase across nearly all eight counties. Under a medium emissions scenario, projected increases in the frequency of days with high concentrations of wildfire-specific particulate matter between 2004–2009 and 2046–2051 range on average from 0% greater frequency in Sherman County to 122% greater frequency in Malheur County.








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 under climate change in parts of eastern Oregon that experience an increase in vegetation cover from the carbon dioxide fertilization effect.

Increased Invasive Species. 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 snowpack reduction.

Table 1 Summary of projected direction of changes in climate change-related risk of natural hazard occurrence across eight Oregon counties. Within each box, symbols denote the direction of expected change in risk: increasing, decreasing, or unchanging; and shading denotes the level of confidence in the projected direction of change. High confidence means nearly all models agree on the direction of change and there is strong evidence in the published literature. Medium confidence means a majority of models agree on the direction of change and there is strong to medium evidence in the published literature. 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.

	Hood River	Wasco	Sherman	Gilliam	Wheeler	Malheur	Harney	Lake
 Heat Waves	↑	↑	↑	↑	↑	↑	↑	↑
 Cold Waves	↓	↓	↓	↓	↓	↓	↓	↓
 Heavy Rains	↑	↑	↑	↑	↑	↑	↑	↑
 River Flooding	↑	↑	↑	↑	↑	↑	↑	↑
 Drought	↑	↑	=	=	↑	↑	↑	↑
 Wildfire	↑	↑	↑	↑	↑	↑	↑	↑
 Poor Air Quality	↑	↑	=	↑	↑	↑	↑	↑
Windstorms	=	=	=	=	=	=	=	=
Dust Storms	↓	↓	↓	↓	↓	↓	↓	↓
Increased Invasive Species	↑	↑	↑	↑	↑	↑	↑	↑
Loss of Wetland Ecosystems	↑	↑	↑	↑	↑	↑	↑	↑

Level of Confidence in Direction of Change	
	High Confidence
	Medium Confidence
	Low Confidence

Expected Direction of Change	
↑	Risk Increasing
↓	Risk Decreasing
=	Risk Unchanging

Future Climate Projections Gilliam County

August 2018

A Report to the Oregon Department of Landscape Conservation and Development

*Prepared by
The Oregon Climate Change Research Institute*



*Photo credit: Historic McDonald Crossing by Greg Shine, BLM <https://flic.kr/p/U3aUPL>,
Creative Commons License (CC BY 2.0)*



Future Climate Projections: Gilliam County

A report to the Oregon Department of Landscape Conservation and Development

Prepared by:

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August 2018

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Executive Summary

This report presents future climate projections for Gilliam County relevant to specific natural hazards for the 2020s (2010–2039 average) and 2050s (2040–2069 average) compared 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 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 Gilliam County, the frequency of hot days with temperatures at or above 90°F is projected to increase on average by 33 days (with a range of 14 to 45 days) by the 2050s under the higher emissions scenario compared to the historical baseline.

In Gilliam County, the temperature of the hottest day of the year is projected to increase by 8°F (with a range of 3 to 12°F) by the 2050s under the higher emissions scenario compared to the historical baseline.



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 Gilliam County, the frequency of days at or below freezing is projected to decline on average by 7 days (with a range of 3 to 12 days) by the 2050s under the higher emissions scenario compared to the historical baseline.

In Gilliam County, the temperature of the coldest night of the year is projected to increase by 9°F (with a range of 0 to 15°F) by the 2050s under the higher emissions scenario compared to the historical baseline.



Heavy Rains

The intensity of extreme precipitation events is expected to increase slightly in the future as the atmosphere warms and is able to hold more water vapor.

In Gilliam County, the magnitude of precipitation on the wettest day and wettest consecutive five days per year is projected to increase on average by about 17% (with a range of 4% to 49%) and 12% (with a range of -6% to 33%), respectively, by the 2050s under the higher emissions scenario compared to the historical baseline.

In Gilliam County, 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.



River Flooding

Flood risk to Gilliam County from the Columbia River is not expected to change substantially based on insubstantial projected changes in non-regulated flood magnitudes on the Columbia River at John Day.

Mid- to low-elevation tributaries, such as the John Day River, that are near the freezing level in winter, receiving a mix of rain and snow, may experience an increase in winter flood risk due to warmer winter temperatures causing precipitation to fall more as rain and less as snow.

Non-regulated flood magnitudes on the John Day River at McDonald Ferry are projected to increase by the 2050s compared to the historical baseline under both emissions scenarios.



Drought

Drought conditions, as represented by low summer soil moisture and low summer runoff, may become less frequent in Gilliam County by the 2050s compared to the historical baseline.



Wildfire

Wildfire risk, as expressed through the frequency of very high fire danger days, is projected to increase under future climate change. In Gilliam County, the frequency of very high fire danger days per year is projected to increase on average by about 41% (with a range of -15 to +105%) 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 Gilliam County. The number days with high concentrations of wildfire-specific particulate matter is projected to increase by 93% 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 & Pests

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). 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, and air quality.

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 scope of this report is limited to the geographic area encompassed by the eight Oregon counties (thus including the counties, the cities within them and the Burns Paiute Tribe) that are part of the two Pre-Disaster Mitigation (PDM) 16 grants DLCDC received. Those counties include: Wasco, Hood River, Harney, Lake, Malheur, Wheeler, Sherman, and Gilliam Counties. 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 lists in Table 1. This information will be integrated into the Natural Hazards Mitigation Plan (NHMP) updates for the eight counties, and can be used in other county plans, policies, and programs. In addition to this report, sharing of data, and other technical assistance will be provided to the counties.

Table 1 Natural hazards and related climate metrics evaluated in this project.

 <p>Heavy Rains Wettest Day ♦ Wettest Five Days Landslide Threshold Exceedance</p>	 <p>Heat Waves Hottest Day ♦ Warmest Night “Hot” Days ♦ “Warm” Nights</p>
 <p>River Flooding Annual maximum daily flows</p>	 <p>Cold Waves Coldest Day ♦ Coldest Night “Cold” Days ♦ “Cold” Nights</p>
 <p>Drought Summer Flow ♦ Spring Snow Summer Soil Moisture</p>	 <p>Air Quality Unhealthy Smoke Days</p>
 <p>Wildfire Fire Danger Days</p>	<p>Windstorms ♦ Dust Storms Increased Invasive Species & Pests Loss of Wetland Ecosystems</p>

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 1 are presented for an early 21st century period and a mid 21st century period compared 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 & Uncertainty in the Appendix.)

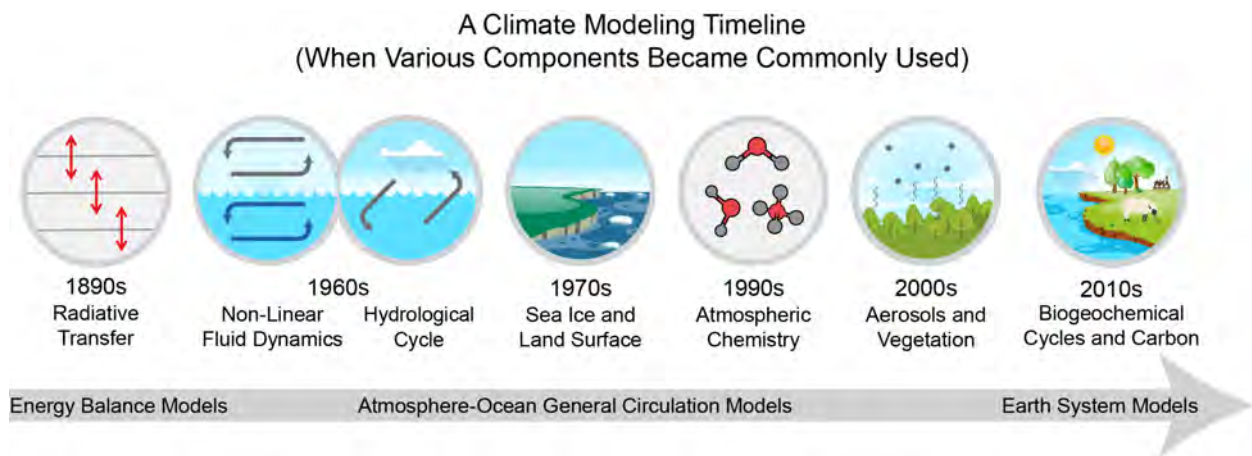


Figure 1 As scientific understanding of climate has evolved over the last 120 years, increasing amounts of physics, chemistry, and biology have been incorporated into calculations and, eventually, models. This figure shows when various processes and components of the climate system became regularly included 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, scientist 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 increase in global temperature is expected (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.)

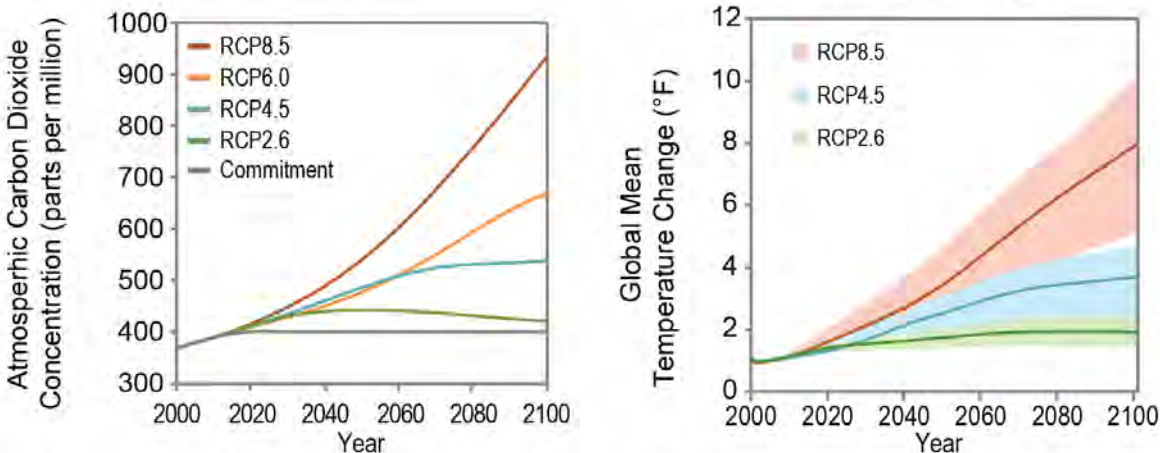


Figure 2 Future scenarios of atmospheric carbon dioxide concentrations (left) and global temperature change (right) resulting from several different emissions pathways, called Representative Concentration Pathways (RCPs), which are considered in the fourth and most recent National Climate Assessment. (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, global climate model 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 to an average historical baseline across at least 30 years. For the future climate projections produced by OCCRI, two 30-year future periods are presented in comparison with a 30-year historical baseline (Table 2).

Table 2 Historical and future time periods for presentation of future climate projections

Historical Baseline	Early 21 st Century "2020s"	Mid 21 st Century "2050s"
1971–2000	2010–2039	2040–2069

How to Use the Information in this Report

Under a changing climate, past trends, while valuable, may no longer be, on their own, reliable predictors of future outcomes. 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. 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 predictions 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.

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 1895–2015. 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” compared 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 Gilliam 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 Gilliam County compared to the 1971–2000 historical baseline range from 1.0–3.7°F by the 2020s and 1.8–7.4°F by the 2050s, depending on emissions scenario and climate model (Table 3).

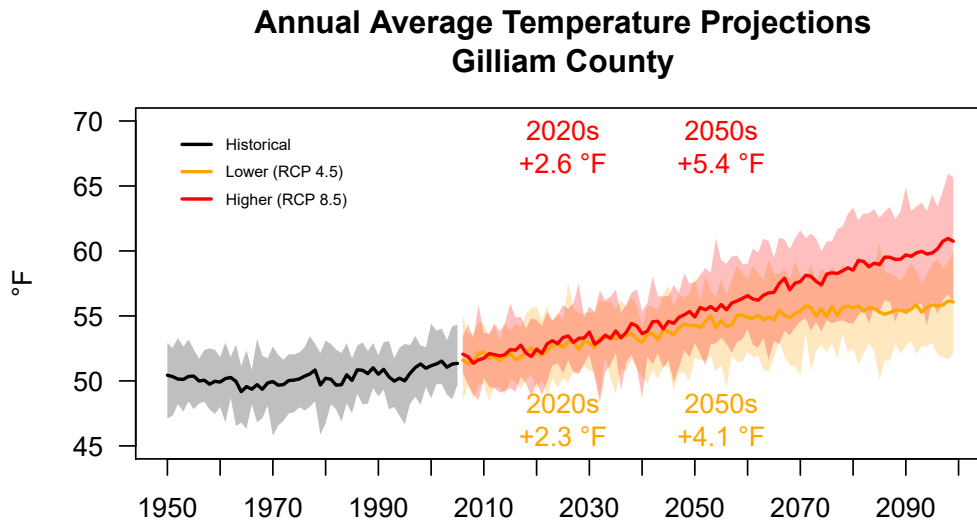


Figure 3 Annual average temperature projections for Gilliam County as simulated by 20 downscaled global climate models under a lower (RCP 4.5) and a higher (RCP 8.5) greenhouse gas emissions scenario. Solid line and shading depicts the 20-model mean and range, respectively. The multi-model mean differences for the 2020s (2010–2039 average) and the 2050s (2040–2069 average) compared to the historical baseline (1971–2000 average) are shown.

Table 3 Average and range of projected future changes in Gilliam County’s average temperature 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 20 global climate models.

	Change by Early 21 st Century “2020s”	Change by Mid 21 st Century “2050s”
Higher (RCP 8.5)	+2.6°F (1.5 to 3.7)	+5.4°F (2.9 to 7.4)
Lower (RCP 4.5)	+2.3°F (1.0 to 3.6)	+4.1°F (1.8 to 5.8)



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 4).

Table 4 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 Gilliam County, all the extreme heat metrics in Table 4 are projected to increase by the 2020s and 2050s under both the lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios (Table 5). For example, compared to the 1971–2000 historical baseline, by the 2050s under the higher emissions scenario, the number of hot days greater than or equal to 90°F is projected to increase by 33 days on average with a range of about 14 to 45 days. Likewise, the temperature of the hottest day of the year is projected to increase by 8.0°F on average with a range of 2.9°F to 12.1°F and the frequency of daytime heat waves is projected to increase by 2.4 events per year.

Projected changes in the frequency 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 5 Mean and range of projected future changes in extreme heat metrics for Gilliam 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 20 global climate models.

	Change by Early 21 st Century “2020s”		Change by Mid 21 st Century “2050s”	
	Lower	Higher	Lower	Higher
Hot Days	+12.6 days (4.9–19.9)	+14.9 days (5.6–20.7)	+24.2 days (10.2–36.3)	+33.4 days (14.0–45.2)
Warm Nights	+4.2 days (0.8–8.5)	+5.1 days (2.3–8.6)	+9.9 days (1.6–19.1)	+16.5 days (4.9–32.4)
Hottest Day	+3.4°F (0.7–5.9)	+4.0°F (1.0–6.4)	+6.0°F (2.3–11.5)	+8.0°F (2.9–12.1)
Warmest Night	+2.5°F (0.7–4.0)	+2.9°F (0.8–4.2)	+4.4°F (1.6–7.4)	+6.5°F (3.3–9.7)
Daytime Heat Waves	+1.3 events (0.6–2.2)	+1.5 events (0.8–2.2)	+2.1 events (1.3–3.9)	+2.4 events (1.7–4.3)
Nighttime Heat Waves	+0.6 events (0.0–1.0)	+0.7 events (0.3–1.1)	+1.3 events (0.1–2.6)	+2.1 events (0.2–3.6)

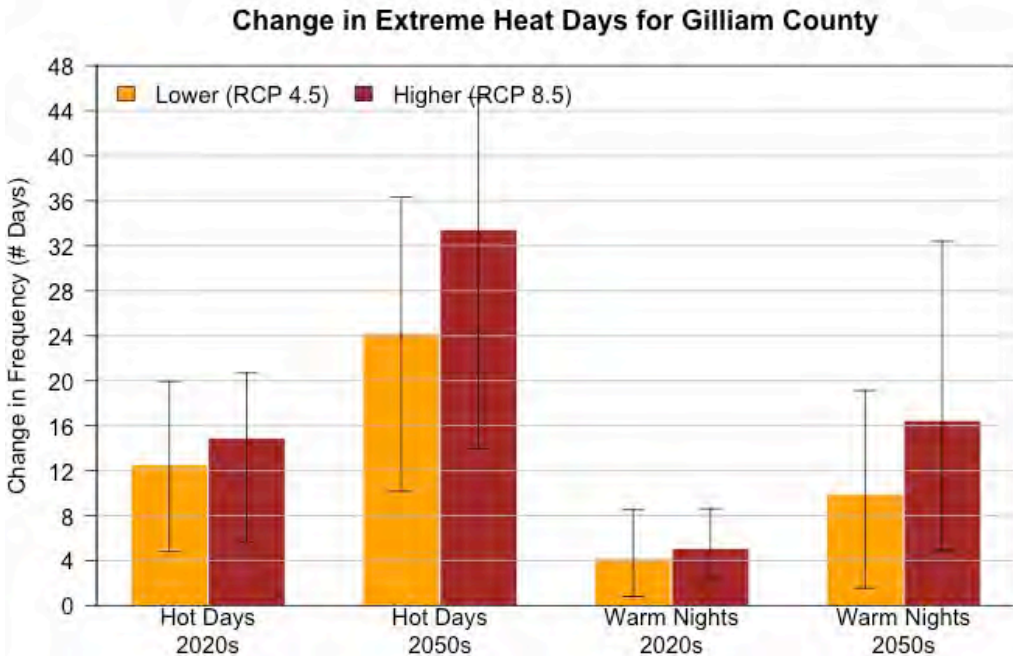


Figure 4 Projected future changes in the number of hot days (left two sets of bars) and number of warm nights (right two sets of bars) for Gilliam County from the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models. The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs. 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.

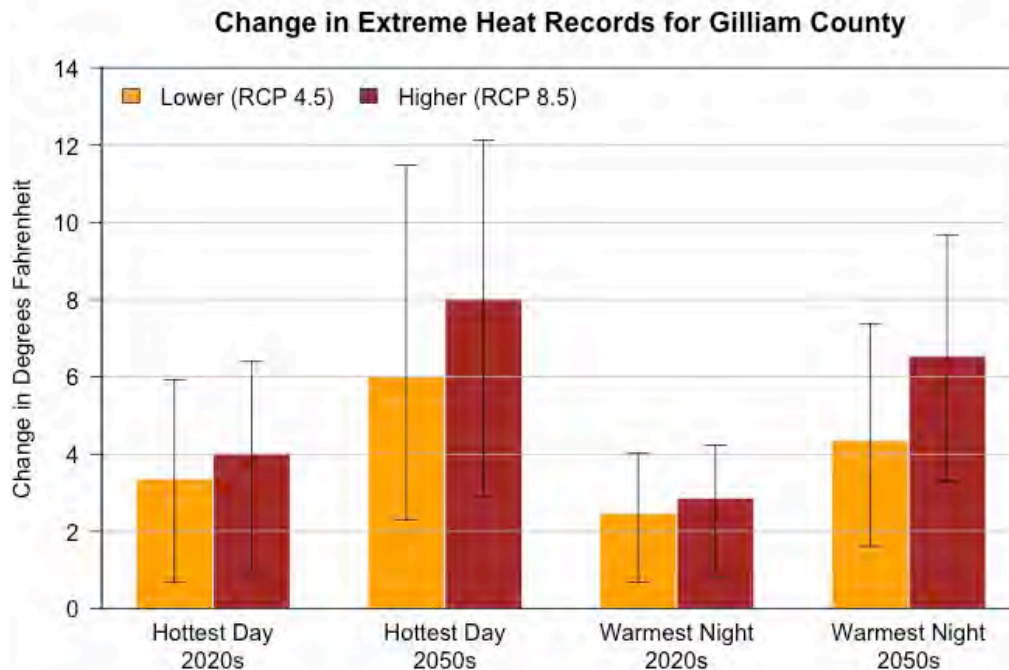


Figure 5 Projected future changes in the hottest day of the year (left two sets of bars) and warmest night of the year (right two sets of bars) for Gilliam County from the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models. The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs.

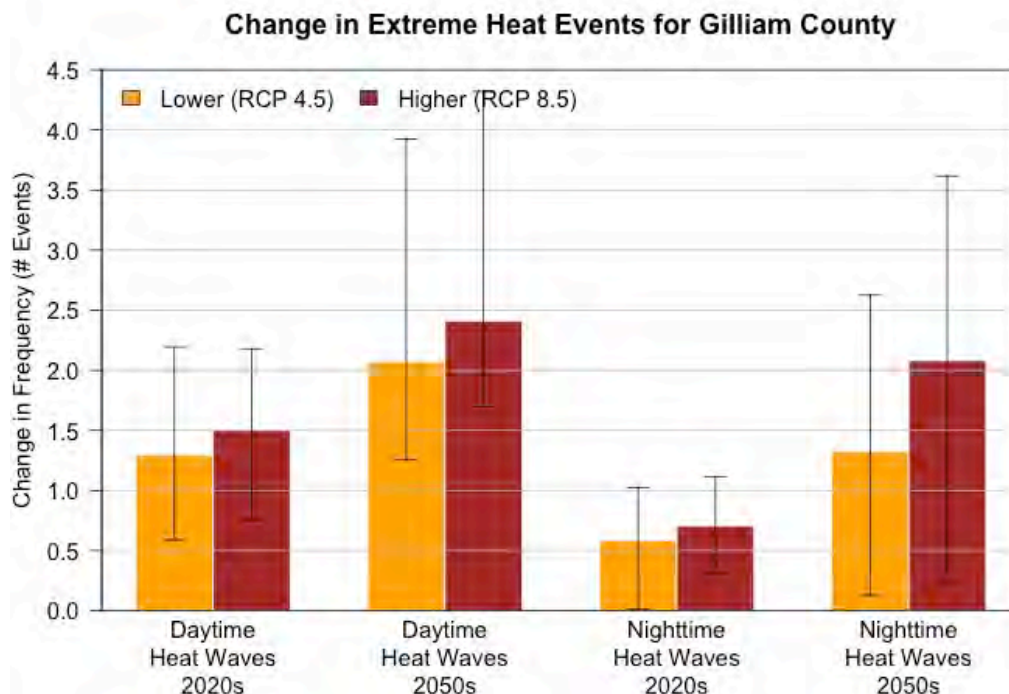


Figure 6 Projected future changes in the number of daytime heat waves (left two sets of bars) and number of nighttime heat waves (right two sets of bars) for Gilliam County from the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models. The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs. 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 Gilliam County, all the extreme heat metrics in Table 4 are projected to increase by the 2020s and 2050s under both the lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios (Table 5).
- ⇒ In Gilliam County, the frequency of hot days with temperatures at or above 90°F is projected to increase on average by 33 days (with a range of 14 to 45 days) by the 2050s under the higher emissions scenario compared to the historical baseline.
- ⇒ In Gilliam County, the temperature of the hottest day of the year is projected to increase by 8°F (with a range of 3 to 12°F) by the 2050s under the higher emissions scenario compared to the historical baseline.



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 6).

Table 6 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 Gilliam County, the extreme cold metrics in Table 6 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 7). For example, by the 2050s under the higher emissions scenario, the number of cold days less than or equal to 32°F is projected to decrease by 7 days on average with a range of about 3 to 12 days. Likewise, the temperature of the coldest night of the year is projected to increase by 8.7°F on average with a range of 0.3°F to 15.0°F and the frequency of daytime cold waves is projected to decrease by 1.0 events per year.

Projected changes in the frequency 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 7 Mean and range of projected future changes in extreme cold metrics for Gilliam 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 20 global climate models.

	Change by Early 21 st Century “2020s”		Change by Mid 21 st Century “2050s”	
	Lower	Higher	Lower	Higher
Cold Days	-3.5 days (-6.7 to 1.6)	-4.5 days (-7.9 to -1.2)	-6.4 days (-9.2 to -2.1)	-7.3 days (-11.5 to -2.5)
Cold Nights	-0.4 days (-1.3 to 0.6)	-0.7 days (-1.4 to 0.2)	-0.9 days (-1.5 to 0.0)	-0.9 days (-1.5 to 0.1)
Coldest Day	+2.1°F (-1.9 to 5.0)	+3.6°F (0.3 to 6.4)	+5.5°F (0.5 to 10.3)	+6.6°F (0.1 to 11.2)
Coldest Night	+2.9°F (-2.2 to 8.1)	+4.9°F (0.9 to 11.0)	+7.1°F (1.2 to 12.9)	+8.7°F (0.3 to 15.0)
Daytime Cold Waves	-0.5 events (-1.1 to 0.4)	-0.6 events (-1.3 to -0.1)	-0.9 events (-1.5 to -0.4)	-1.0 events (-1.7 to -0.3)
Nighttime Cold Waves	-0.0 events (-0.2 to 0.1)	-0.1 events (-0.2 to 0.0)	-0.1 events (-0.3 to 0.0)	-0.1 events (-0.3 to -0.0)

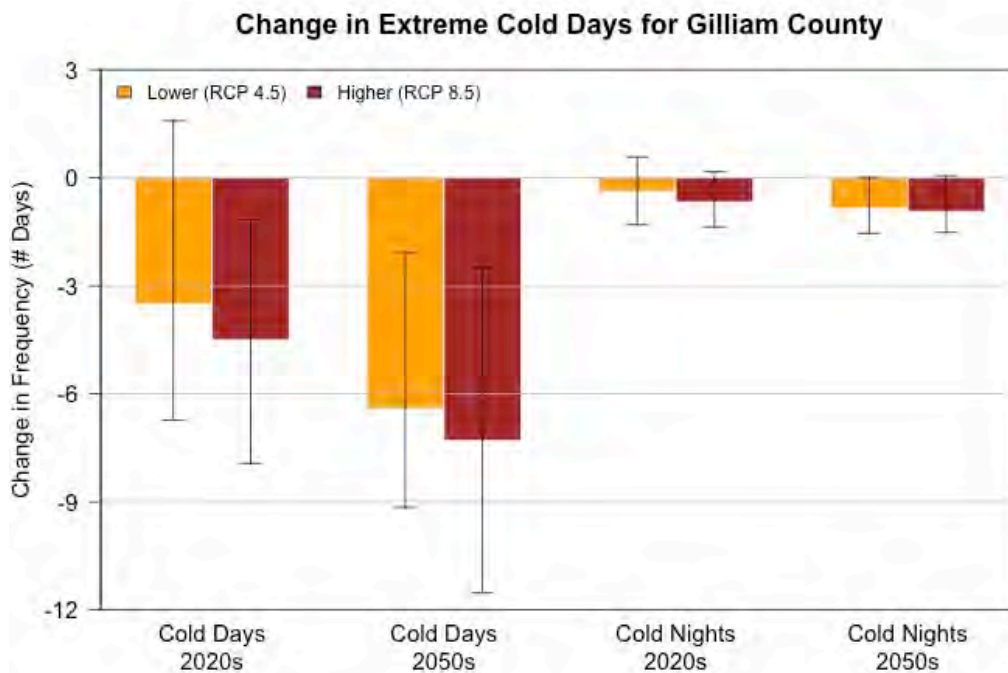


Figure 7 Projected future changes in the number of cold days (left two sets of bars) and number of cold nights (right two sets of bars) for Gilliam County from the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models. The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs. 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.

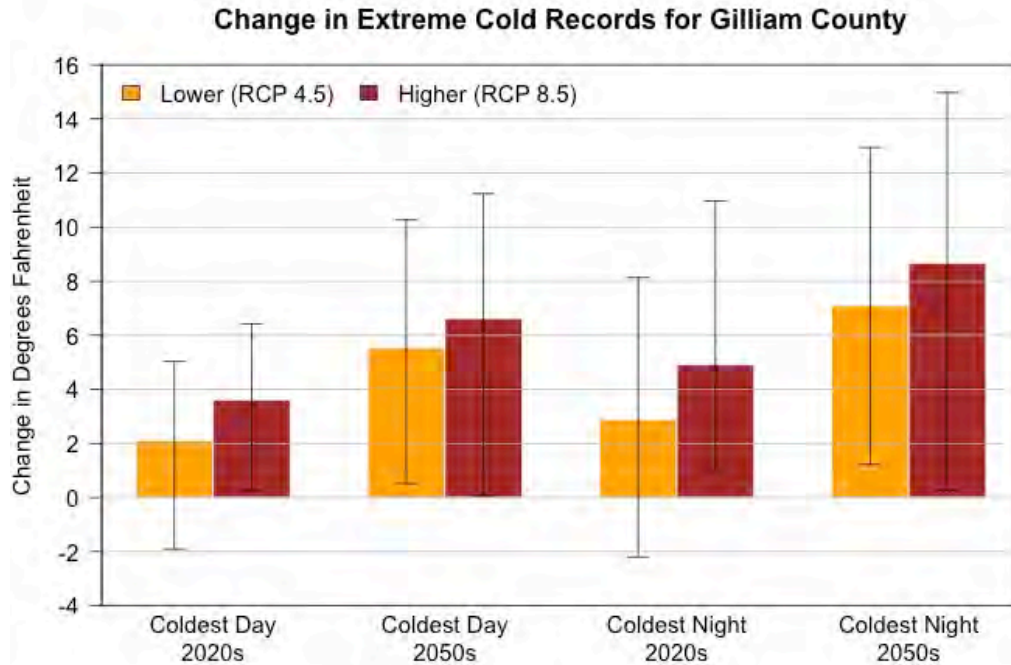


Figure 8 Projected future changes in the coldest day of the year (left two sets of bars) and coldest night of the year (right two sets of bars) for Gilliam County from the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models. The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs.

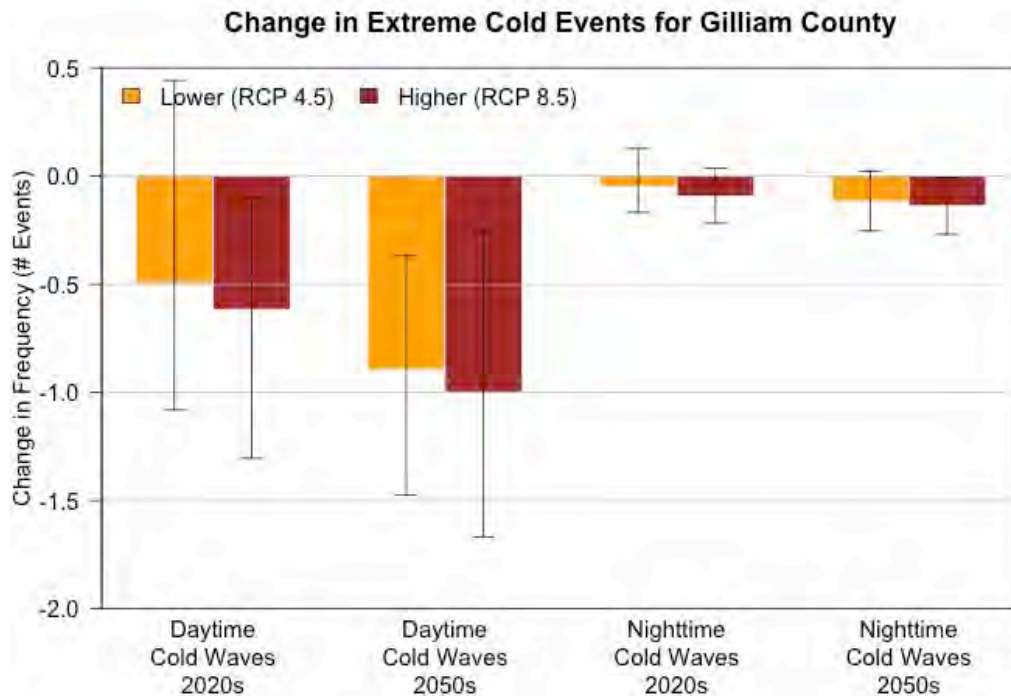


Figure 9 Projected future changes in the number of daytime cold waves (left two sets of bars) and number of nighttime cold waves (right two sets of bars) for Gilliam County from the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models. The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs. 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 Gilliam County, the extreme cold metrics in Table 6 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 7).
- ⇒ In Gilliam County, the frequency of days at or below freezing is projected to decline on average by 7 days (with a range of 3 to 12 days) by the 2050s under the higher emissions scenario compared to the historical baseline.
- ⇒ In Gilliam County, the temperature of the coldest night of the year is projected to increase by 9°F (with a range of 0 to 15°F) by the 2050s under the higher emissions scenario compared to the historical baseline.



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. 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. 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 slightly in the future (Dalton *et al.*, 2017). This report presents projected changes for four metrics of precipitation extremes (Table 8).

Table 8 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 with precipitation greater than 0.75 inches per year
Landslide Risk Days	Number of days per water year exceeding the USGS landslide threshold ³ : https://pubs.er.usgs.gov/publication/ofr20061064 <ul style="list-style-type: none"> ○ $P3/(3.5-.67*P15)>1$ where ○ P3 = Previous 3-day precipitation accumulation ○ P15 = 15-day precipitation accumulation prior to P3

² Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)

³ This threshold was developed for Seattle, Washington and may or may not have similar applicability to other locations.

In Gilliam County, the magnitude of precipitation on the wettest day and wettest consecutive five days is projected to increase on average by the by the 2020s and 2050s under both the lower and higher emissions scenarios (Table 9). However, some models project decreases in these metrics for certain time periods and scenarios. For example, by the 2050s under the higher emissions scenario, the magnitude, or amount, of precipitation on the wettest day of the year is projected to increase by 17.3% on average with a range of about 3.8 to 49.1%. Likewise, the magnitude of precipitation on the wettest consecutive five days of the year is projected to increase by 12.0% on average with a range of -5.7 to 33.4%. The average number of days per year with precipitation greater than 3/4" isn't projected to change substantially.

Landslides are often triggered by rainfall when the soil becomes saturated. A cumulative rainfall threshold serves as a surrogate for landslide risk. For Gilliam County, the average number of days per year exceeding the landslide risk threshold is projected to remain about the same. It is important to note that the landslide threshold used in this report 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 9 Mean and range of projected future changes in extreme precipitation metrics for Gilliam 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 20 global climate models.

	Change by Early 21 st Century "2020s"		Change by Mid 21 st Century "2050s"	
	Lower	Higher	Lower	Higher
Wettest Day	+10.6% (-4.8 to 30.7)	+8.7% (-3.0 to 22.9)	+15.8% (0.7 to 31.1)	+17.3% (3.8 to 49.1)
Wettest Five-Days	+6.6% (-9.1 to 22.0)	+4.9% (-8.6 to 21.0)	+9.6% (-7.7 to 27.6)	+12.0% (-5.7 to 33.4)
Wet Days	+0.2 days (-0.1 to 0.5)	+0.1 days (-0.0 to 0.4)	+0.2 days (0.0 to 0.4)	+0.2 days (0.0 to 0.5)
Landslide Risk Days	+0.0 days (-0.1 to 0.2)	+0.0 days (-0.1 to 0.5)	+0.0 days (-0.1 to 0.2)	+0.1 days (-0.1 to 0.3)

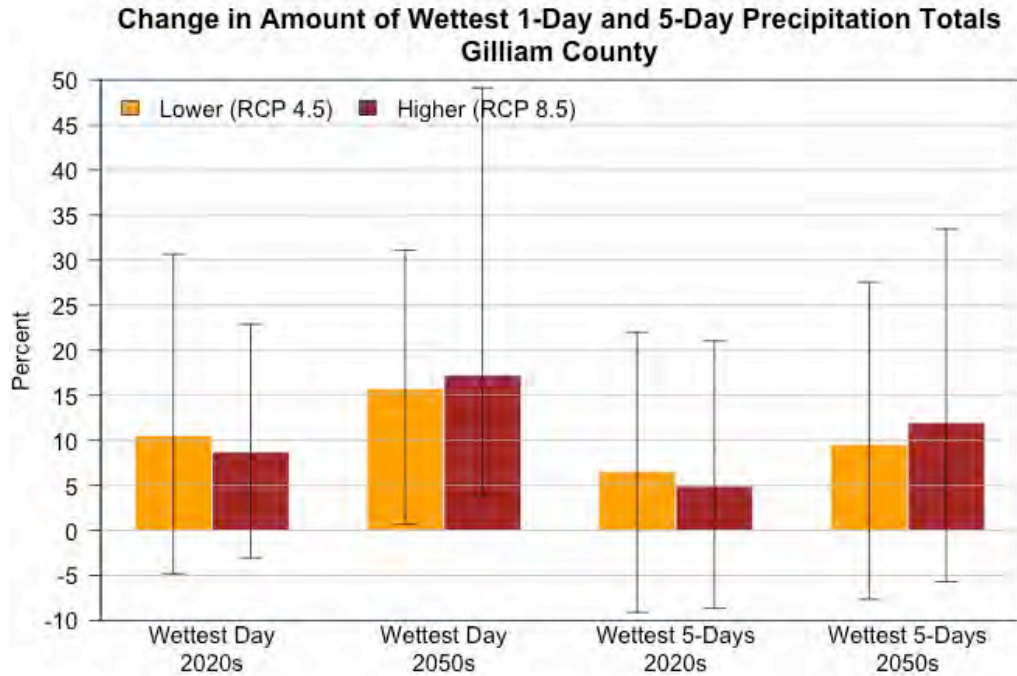


Figure 10 Projected future changes in the wettest day of the year (left two sets of bars) and wettest consecutive five days of the year (right two sets of bars) for Gilliam County from the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models. The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs.

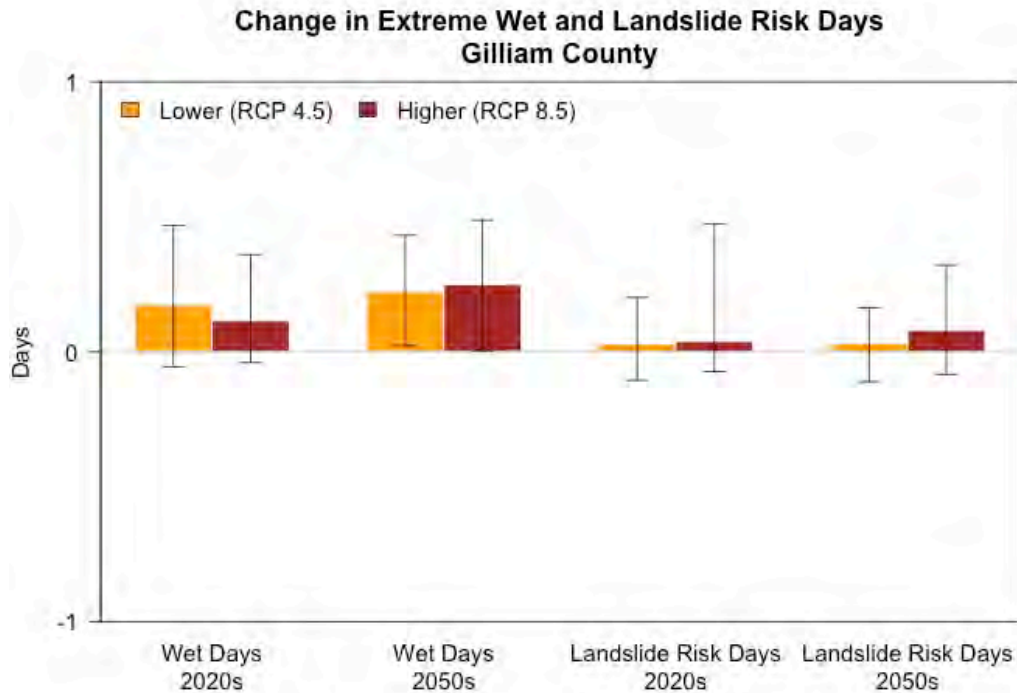


Figure 11 Projected future changes in the frequency of wet days (left two sets of bars) and landslide risk days (right two sets of bars) for Gilliam County from the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 20 global climate models. The bars and whiskers display the mean and range, respectively, of changes across the 20 GCMs.

Key Messages:

- ⇒ The intensity of extreme precipitation events is expected to increase slightly in the future as the atmosphere warms and is able to hold more water vapor.
- ⇒ In Gilliam County, the magnitude of precipitation on the wettest day and wettest consecutive five days per year is projected to increase on average by about 17% (with a range of 4% to 49%) and 12% (with a range of -6% to 33%), respectively, by the 2050s under the higher emissions scenario compared to the historical baseline.
- ⇒ In Gilliam County, the frequency of days with at least $\frac{3}{4}$ " of precipitation and the frequency of days exceeding a threshold for landslide risk is not projected to change substantially.



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 (Naz *et al.*, 2016; Raymondi *et al.*, 2013).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).

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 (Najafi and Moradkhani, 2015; Naz *et al.*, 2016; Salathé *et al.*, 2014). 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

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). During 1998–2014 in the California Sierra Nevada, atmospheric rivers were associated with half of all rain-on-snow events (Guan *et al.*, 2016). As a result of climate warming, rain-on-snow events are projected to decline at lower elevations, due to decreasing snow cover, and to increase at higher elevations as the number of rainy as opposed to snowy days increases (Safeeq *et al.*, 2015; Surfleet and Tullos, 2013).⁶ 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).

This report describes projected changes in the mean monthly hydrograph of the Columbia River at John Day. Mean monthly flows do not translate directly to flood risk because floods occur at shorter time scales. However, increases in higher monthly flow may imply increases in flood likelihood, particularly if increases are projected for months when flood occurrence has been historically high. This report also describes changes in the magnitude of flood events in terms of the water year maximum daily flows with 50%, 10%, and 4% exceedance probabilities. In other words, these are the projected changes in the magnitude of the 2-year, 10-year, and 25-year return period single-day flood events, respectively. This flood analysis compares flood magnitudes between a historical baseline (1961–2010) and the 2050s (here, 2031–2080). These longer time periods, as required by the flood analysis, overlap with the time periods used throughout the rest of the report by adding a decade to

⁴ Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)

⁵ Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)

⁶ Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)

either end. An analysis of flood risk projections for the 2020s was not done because the required time period would have overlapped the historical baseline. These analyses are exploratory and should not be used for engineering or design.

On the Columbia River at John Day, the monthly hydrograph is characteristic of a snow-dominated basin with peak flows during the late spring snowmelt season (Figure 12). By the 2050s, under both emissions scenarios, the peak streamflow 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.

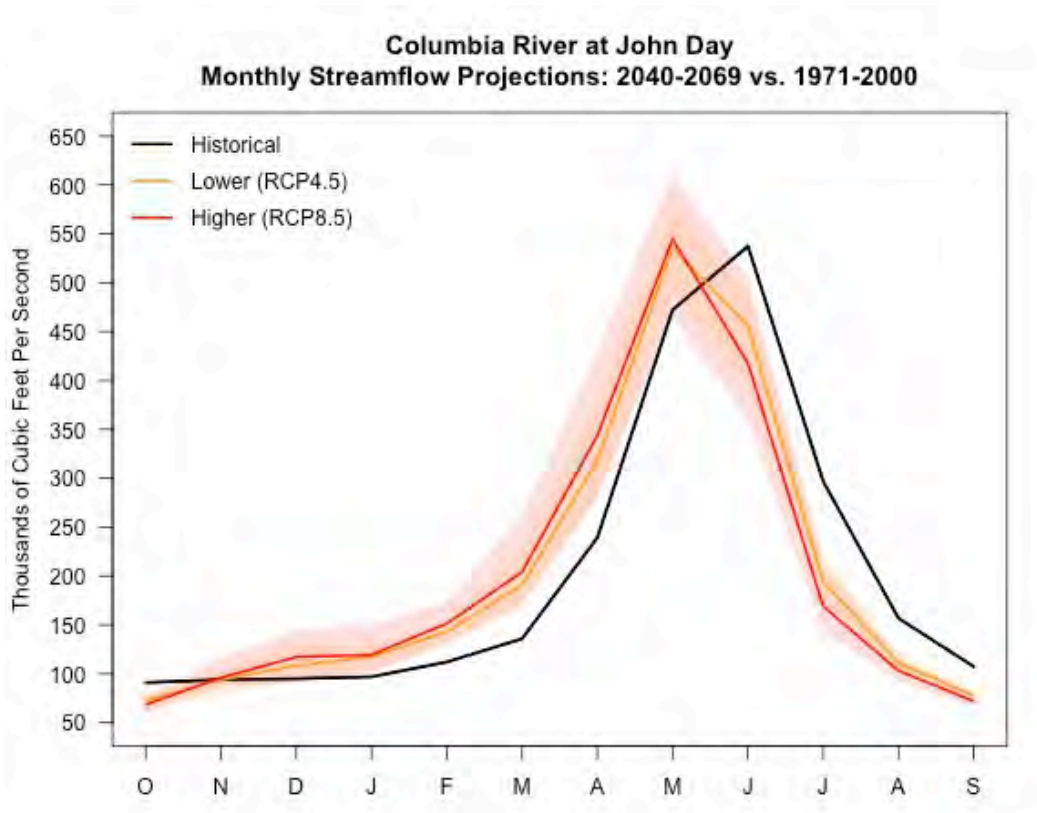


Figure 12 Simulated historical and future bias-corrected mean monthly non-regulated streamflow at the Columbia River at John Day for 2040–2069 compared to 1971–2000. Solid lines and shading depict the mean and range across ten global climate models. (Data source: Integrated Scenarios of the Future Northwest Environment, <https://climatetoolbox.org/tool/Streamflow-Projections>)

On the Columbia River at John Day, the magnitude of the 2-year (50% exceedance probability) and 10-year (10% exceedance probability) single-day flood events are projected, on average, to remain about the same for the period 2031–2080 compared with 1961–2010 under both the lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios (Figure 13). The magnitude of the 25-year (4% exceedance probability) single-day flood event is projected to increase by about 4% under both emissions scenarios. However, some models show increases and others show decreases in the magnitude of maximum daily streamflows for each flood frequency considered. Moreover, the wide spread in individual model projections relative to the size of the mean change implied there is not strong evidence for a substantial change in non-regulated flood magnitudes on the Columbia River at John Day.

On the John Day River at McDonald Ferry, the magnitude of the 2-year (50% exceedance probability), 10-year (10% exceedance probability), and 25-year (4% exceedance probability) single-day flood events are projected to increase for the period 2031–2080 compared with 1961–2010 under both the lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios (Figure 14).

Across the western US, the 100-year and 25-year peak flow magnitude is 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). However, along the Columbia River bordering Oregon, peak flows are projected to decrease as a result of the complex interaction between earlier snowmelt and the transition of precipitation falling more as rain and less as snow in this snow-dominated basin (Maurer *et al.*, 2018).

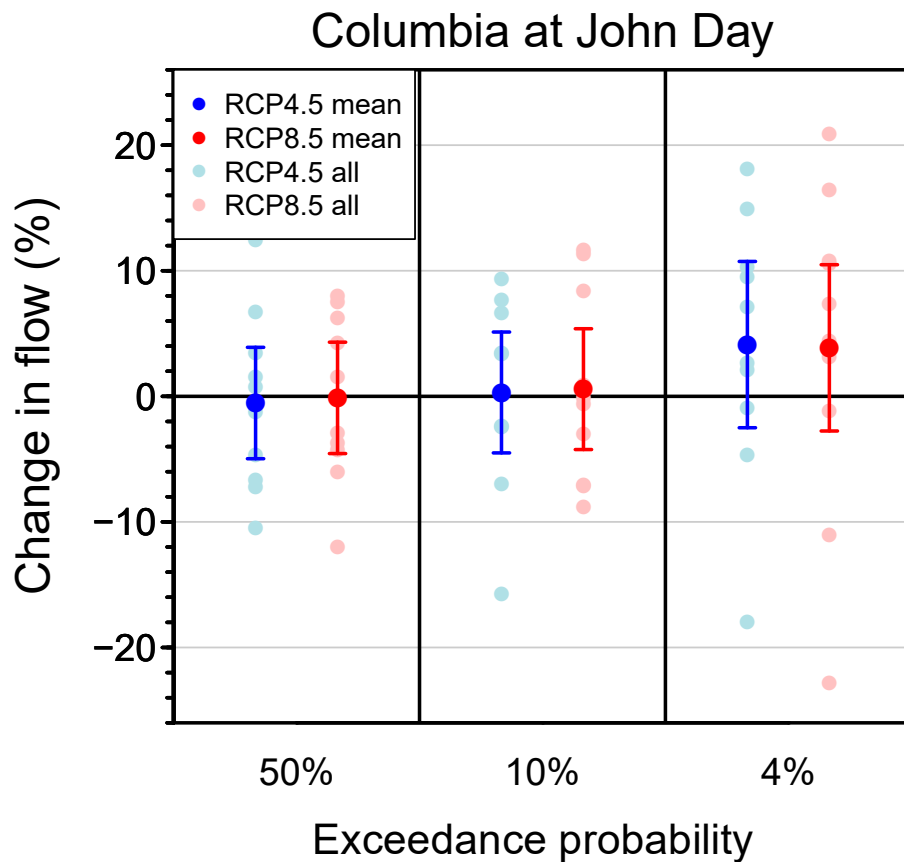


Figure 13 Projected change in water year maximum daily non-regulated bias-corrected streamflows with 50%, 10%, and 4% probability of exceedance for the Columbia River at John Day between 1961–2010 and 2031–2080 under lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios. Larger blue and red dots and bars depict the mean plus and minus two standard errors across all projections (ten global climate models). The smaller light blue and light red dots represent individual models. (Data source: Integrated Scenarios of the Future Northwest Environment, <https://climate.northwestknowledge.net/IntegratedScenarios/>; Figure source: David Rupp, OCCRI)

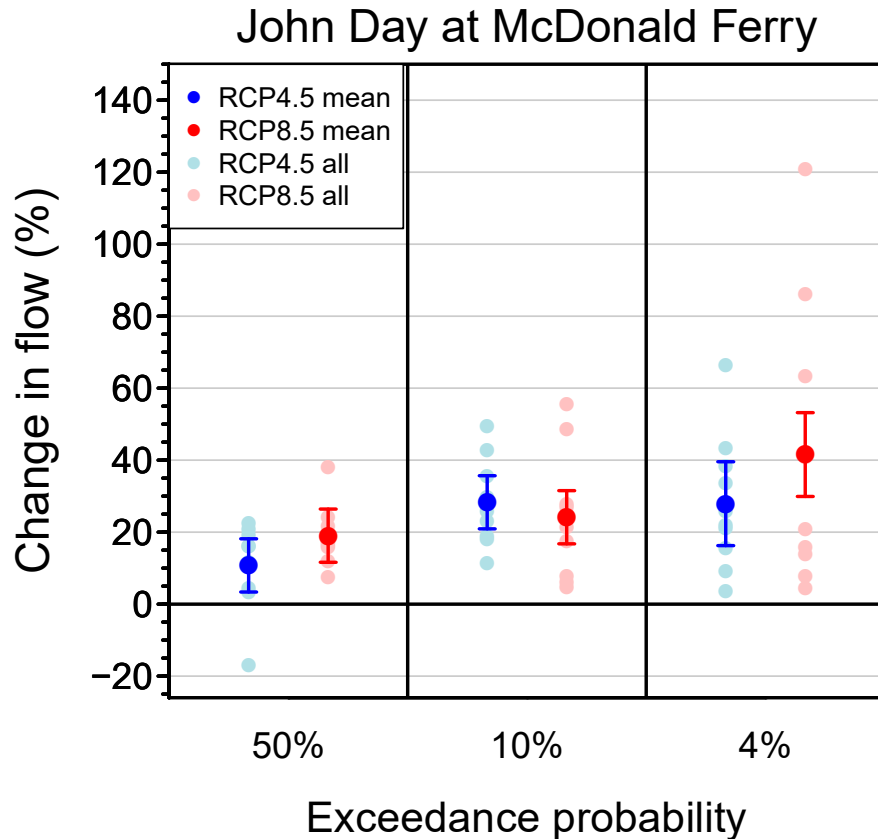


Figure 14 Projected change in water year maximum daily non-regulated, non-bias-corrected streamflows with 50%, 10%, and 4% probability of exceedance for the John Day at McDonald Ferry between 1961–2010 and 2031–2080 under lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios. Larger blue and red dots and bars depict the mean plus and minus two standard errors across all projections (ten global climate models). The smaller light blue and light red dots represent individual models. (Data source: Integrated Scenarios of the Future Northwest Environment, <https://climate.northwestknowledge.net/IntegratedScenarios/>; Figure source: David Rupp, OCCRI)

Key Messages:

- ⇒ Flood risk to Gilliam County from the Columbia River is not expected to change substantially based on insubstantial projected changes in non-regulated flood magnitudes on the Columbia River at John Day.
- ⇒ Mid- to low-elevation tributaries, such as the John Day River, that are near the freezing level in winter, receiving a mix of rain and snow, may experience an increase in winter flood risk due to warmer winter temperatures causing precipitation to fall more as rain and less as snow.
- ⇒ Non-regulated flood magnitudes on the John Day River at McDonald Ferry are projected to increase by the 2050s compared to the historical baseline under both emissions scenarios.



This report presents future changes in two variables indicative of drought conditions—summer soil moisture⁷ and summer runoff. Across the western US, mountain snowpack is projected to decline leading to reduced summer soil moisture in mountainous environments (Gergel *et al.*, 2017). In parts of eastern Oregon, summer soil moisture is projected to increase on average, but the range of projected changes is large and depends on the models' projected change in precipitation, with some models projecting increases and others decreases (Gergel *et al.*, 2017).

Climate change is expected to result in lower summer streamflows in snow-dominated basins across the Pacific Northwest as snowpack melts off earlier due to warmer temperatures and summer precipitation decreases (Dalton *et al.*, 2017). See, for example, the decrease in summer flows expected for the Columbia River at John Day (Figure 12) by the 2050s under both lower and higher emissions scenarios.

Changes in drought conditions for low summer soil moisture and low summer runoff are presented 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. In Gilliam County, summer runoff and summer soil moisture are projected to decline under both lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios by the 2050s. While soil moisture storage is projected to increase in the Northwest Interior, individual GCMs projections for the lowlands are varied since summer soil moisture depends on winter, spring, and summer precipitation (Gergel *et al.*, 2017). The magnitude of low summer soil moisture and low summer runoff expected with a 20% chance in any given year of the historical period being projected to occur less frequently by the 2050s under both emissions scenarios (Figure 15). It is important to note that some models do project increased frequency of low summer runoff and low summer soil moisture even though the average across all models is a decrease in frequency (Figure 15). The 2020s were not evaluated in this drought analysis, but can be expected to be similar but of smaller magnitude to the changes for the 2050s.

⁷ Soil moisture projections are for the total moisture in the soil column from the surface to 140 cm below the surface.

Drought Metrics for Gilliam County

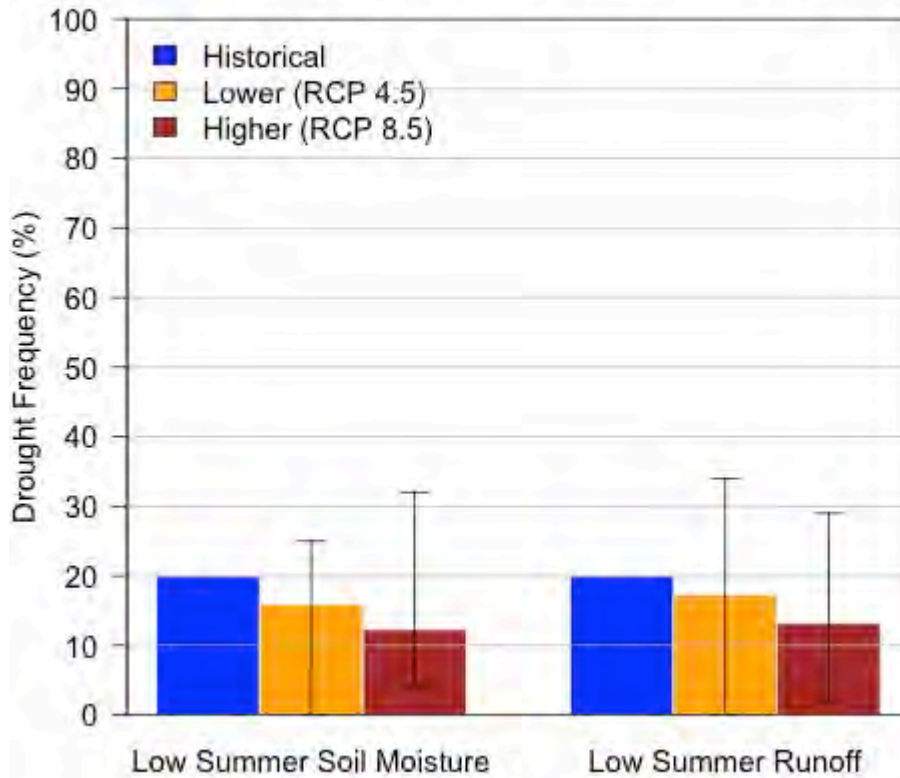


Figure 15 Frequency of the historical baseline (1971–2000) 1-in-5 year event (by definition 20% frequency) of low summer soil moisture (average of June-July-August) and low summer runoff (average of June-July-August) for the future period 2040–2069 for lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios. 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/>)

Key Messages:

⇒ Drought conditions, as represented by low summer soil moisture and low summer runoff, may become less frequent in Gilliam County by the 2050s compared to the historical baseline.



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). Under future climate change, wildfire frequency and area burned are expected to continue increasing in the Pacific Northwest (Barbero *et al.*, 2015; Sheehan *et al.*, 2015).⁸

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 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 16).

⁸ Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)

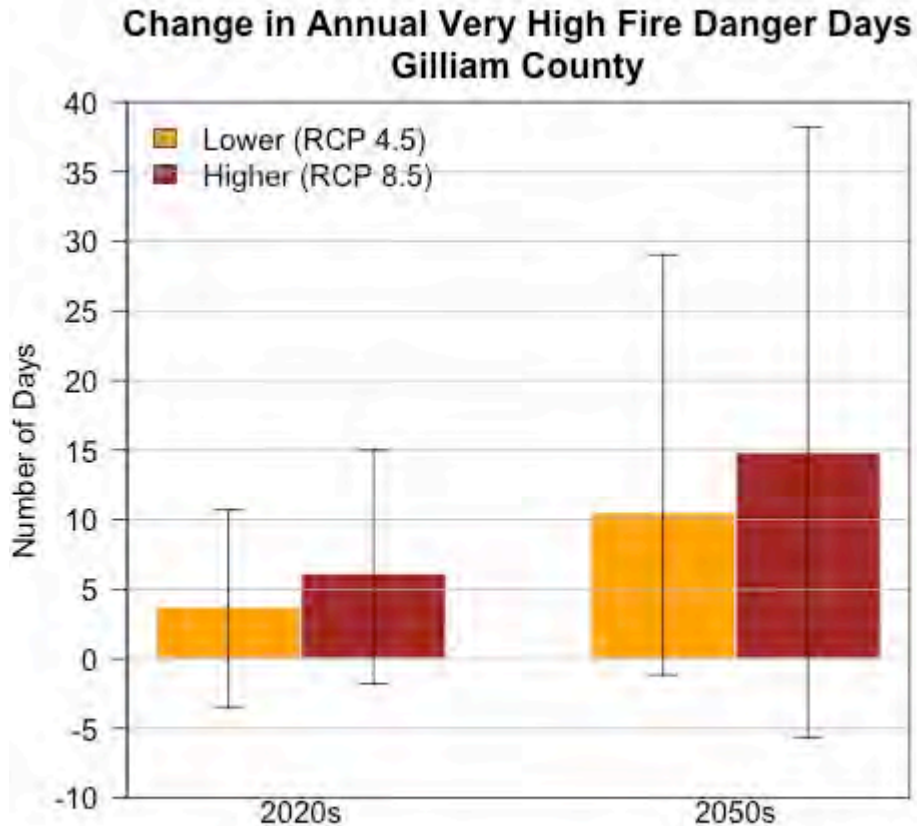


Figure 16 Projected future changes in the frequency of very high fire danger days for Gilliam County from the historical baseline (1971–2000 average) for the 2020s (2010–2039 average) and 2050s (2040–2069 average) under a lower (RCP 4.5) and higher (RCP 8.5) emissions scenario based on 18 global climate 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 Gilliam County.
- ⇒ In Gilliam County, the frequency of very high fire danger days per year is projected to increase on average by nearly 15 days (with a range of -6 to +38 days) by the 2050s under the higher emissions scenario compared to the historical baseline.
- ⇒ In Gilliam County, the frequency of very high fire danger days per year is projected to increase on average by about 41% (with a range of -15 to +105%) 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).⁹ This report presents quantitative projections of future air quality measures related to fine particulate matter (PM_{2.5}) 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 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). Across the western United States, PM_{2.5} levels from wildfires are projected to increase 160% by mid-century under a medium emissions pathway¹¹ (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 PM_{2.5} from wildfires (Liu *et al.*, 2016).¹⁰

The change in risk of poor air quality due to wildfire-specific PM_{2.5} is expressed as the number of “smoke wave” days within a six-year period in the present (2004–2009) and mid-century (2046–2051) under a medium emissions pathway¹¹ (**Error! Reference source not found.**). See Appendix for description of methodology and access to the Smoke Wave data.

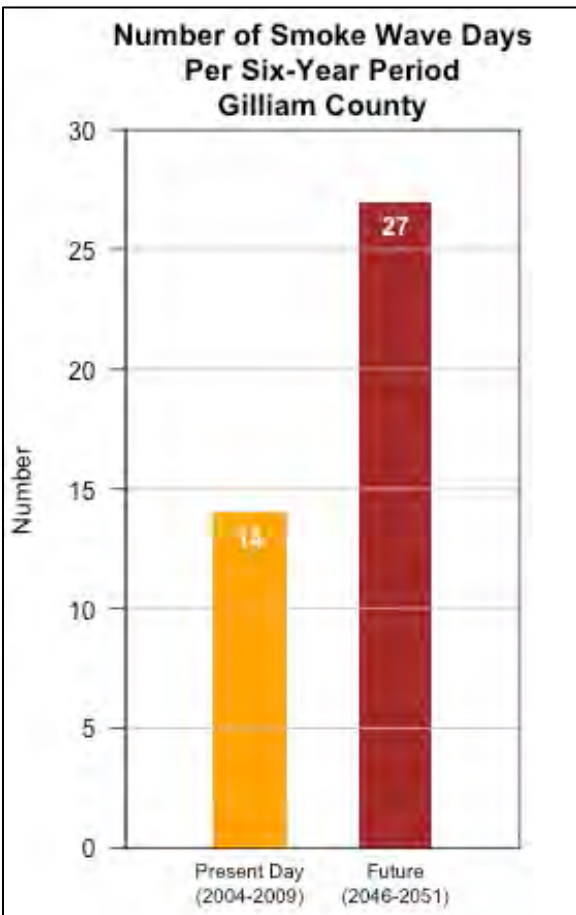


Figure 17 Simulated present day (2004–2009) and future (2046–2051) frequency of “smoke wave” days for Gilliam County under a medium emissions scenario¹¹. The bars display the mean across 15 GCMs. (Data source: Liu *et al.* 2016, <https://khanotations.github.io/smoke-map/>)

⁹ Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)

¹⁰ Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017)

¹¹ 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.

Key Messages:

- ⇒ Under future climate change, the risk of wildfire smoke exposure is projected to increase in Gilliam County.
- ⇒ In Gilliam County, there is projected to be 13 more “smoke wave” days during 2046–2051 under a medium emissions scenario compared with 2004–2009.
- ⇒ In Gilliam County, the number of “smoke wave” days is projected to increase by 93% 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). However, there is a high degree of uncertainty in future projections of extratropical cyclone frequency (IPCC, 2013). 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. 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 & Pests

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).¹²

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).¹³

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.¹⁴

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.¹⁵

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

¹² Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017), p. 49

¹³ Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017), p. 49

¹⁴ Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017), p. 49–50

¹⁵ Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017), p. 70

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.¹⁶

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.

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.¹⁷ Climate change stands to affect freshwater wetlands 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.¹⁸ 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.¹⁹

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.

¹⁶ Verbatim from the Third Oregon Climate Assessment Report (Dalton *et al.*, 2017), p. 67

¹⁷ Verbatim from the Oregon Climate Change Adaptation Framework, p. 62

¹⁸ Verbatim from the Climate Change in the Northwest (Dalton *et al.*, 2013), p. 53

¹⁹ 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 6km 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: <http://maca.northwestknowledge.net/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 4.1.2.1; (Liang *et al.*, 1994) and updates) run on a 1/16th x 1/16th (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 X 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. 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 $1/16^{\text{th}} \times 1/16^{\text{th}}$ (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 management strategies and disaster preparedness programs. We estimate levels of fine particulate matter ($\text{PM}_{2.5}$) 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 $\text{PM}_{2.5}$, 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 $\text{PM}_{2.5}$ standards, wildfires contributed an average of 71.3 % of total $\text{PM}_{2.5}$. 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 variable “Total # of SW days in 6 yrs”. This 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. 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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