

Colton Water District Addendum to the Clackamas County Multi-Jurisdictional Hazard Mitigation Plan

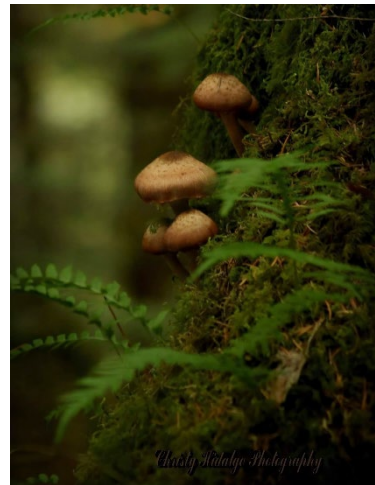
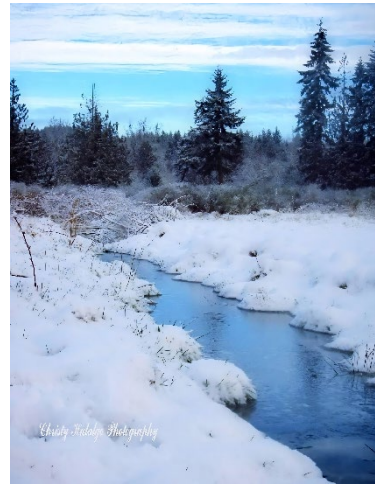


Photo Credits: Teresa Bricker, Chief Todd Gary (Colton RFPD #70), Christy Hidalgo Photography

Effective:

September 12, 2024 – September 11, 2029

Prepared for
Colton Water District



Colton Water District

Adopted:
June 18, 2024, (Resolution # 2024-03)

This Natural Hazard Mitigation Plan was prepared by:



UNIVERSITY OF
OREGON

School of Planning, Public
Policy and Management

Institute for Policy
Research and Engagement

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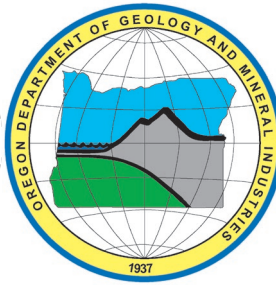


FEMA

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Photo Credit: Chief Todd Gary, Colton RFPD #70, Riverside Fire



FEMA

September 12, 2024

Tootie Smith, Chair
Clackamas County
2051 Kaen Road
Oregon City, Oregon, 97045

Reference: Approval of the Clackamas County Multi-jurisdictional Hazard Mitigation Plan

Dear Chair Smith:

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 Clackamas County multi-jurisdictional hazard mitigation plan for the following jurisdictions:

Clackamas County	City of Canby	City of Estacada
City of Gladstone	City of Happy Valley	City of Lake Oswego
City of Milwaukie	City of Molalla	City of Oregon City
City of Sandy	City of West Linn	City of Wilsonville
Clackamas Fire District #1	Clackamas River Water	Colton Water District
Oak Lodge Water Services		

The approval period for this plan is from September 12, 2024 through September 11, 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.

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).

Chair Smith
September 12, 2024
Page 2

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.

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 Joseph Murray, Mitigation Planner at (503) 378-2911 or joseph.murray@oem.oregon.gov, who coordinates these efforts for local entities.

Sincerely,

Wendy Shaw, P.E.
Risk Analysis Branch Chief

Enclosures

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

JF:JG:WS

Resolution # 2024-03

A Resolution Adopting the Colton Water District Representation in the Updates to the Clackamas County Multi-Jurisdictional Natural Hazards Mitigation Plan

Whereas, the COLTON WATER DISTRICT recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

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

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

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

Whereas, the COLTON WATER DISTRICT has identified natural hazard risks and prioritized a number of proposed actions and programs needed to mitigate the vulnerabilities of the COLTON WATER DISTRICT to the impacts of future disasters within the *Clackamas County, Multi-Jurisdictional Natural Hazards Mitigation Plan*; and

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

Whereas, the Oregon Department of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the *Clackamas County, Multi-Jurisdictional Natural Hazards Mitigation Plan* and pre-approved it (dated, May 29, 2024) contingent upon this official adoption of the participating governments and entities;

Whereas, the NHMP is comprised of three volumes: Volume I -Basic Plan, Volume II – Jurisdiction Addenda, and Volume III – Appendices, collectively referred to herein as the NHMP; and


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

Whereas, the COLTON WATER DISTRICT adopts the NHMP and directs the DISTRICT MANAGER to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

Now, therefore, be it resolved, that the COLTON WATER DISTRICT adopts *the Clackamas County Multi-Jurisdictional Natural Hazards Mitigation Plan* as an official plan; and

Be it further resolved, that the COLTON WATER DISTRICT will submit this Adoption Resolution to the Oregon Department of Emergency Management and Federal Emergency Management Agency, Region10 officials to enable final approval of the *Clackamas County Multi-Jurisdictional Natural Hazards Mitigation Plan*.

Adopted this 18 day of June, 2024



Certifying Official

Purpose

This document serves as the Colton Water District (CWD) addendum to the Clackamas County Multi-Jurisdiction Natural Hazards Mitigation Plan (NHMP). This addendum supplements information contained in Volume I (Basic Plan) which serves as the NHMP foundation and Volume III (Appendices) which provide additional information. This addendum meets all the requirements of Title 44 CFR §201.6 including:

- Multi-jurisdictional **Plan Requirements** §201.6(a)(4),
- Multi-jurisdictional **Planning Process** §201.6(b)(1-3),
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv),
- Multi-jurisdictional **Plan Maintenance Process** §201.6(c)(4), and
- Multi-jurisdictional **Plan Adoption** §201.6(c)(5).
- Multi-Jurisdictional **Participation** §201.6(a)(3),

This is the first addendum to the County NHMP for CWD and builds on other recent CWD planning efforts detailed further in this document.

CWD adopted their addendum to the Clackamas County Multi-jurisdictional NHMP on June 18, 2024. FEMA Region X approved the Clackamas County NHMP and the District’s addendum on September 12, 2024. With approval of this NHMP the District is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act’s hazard mitigation project grants through September 11, 2029.

A description of the jurisdiction specific planning and adoption process follows, along with community specific action items. Information about CWD’s risk relative to the natural hazards relevant to the County is documented in the addendum’s Risk Assessment section. The section considers how CWD’s risk differs from or matches that of the County’s. Additional information on Risk Assessment is provided within the Clackamas County NHMP’s Section 2 –Risk Assessment.

Mitigation Plan Mission

The NHMP mission states the purpose and defines the primary functions of the NHMP. It is intended to be adaptable to any future changes made to the NHMP and need not change unless the community’s environment or priorities change.

CWD concurs with the mission statement developed during the Clackamas County planning process (Volume I, Section 3):

Enhance county resiliency and capacity to address natural hazards by promoting sound public policy and effective mitigation strategies designed to equitably reduce risk and impacts on community members, community lifelines, historic and cultural resources property, and ecological systems.

This can be achieved by increasing public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the county towards building a safer, more sustainable community.

Mitigation Plan Goals

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

CWD concurs with the goals developed during the Clackamas County planning process (Volume I, Section 3). All NHMP goals are important and are listed below in no order of priority. Additionally, the Clackamas County NHMP goals align well with the CWD Strategic Goal to:

Ensure a reliable water supply for the communities we serve by investing in infrastructure and emergency preparedness.

Establishing community priorities within action items neither negates nor eliminates any goals, but it establishes which action items to consider implementing first, should funding become available.

Below is a list of the NHMP goals:

Goal 1: Protect Life and Property

- Develop and implement mitigation and climate adaptation projects and policies that aid in protecting lives by making homes, businesses, community lifelines, and other property more resilient to natural hazards and impacts from climate change.
- Establish mitigation projects and policies that minimize losses and repetitive damages from recurring disasters while promoting insurance coverage for severe hazards.
- Improve hazard identification and risk assessment information to inform and provide recommendations for enhanced resilience in new development decisions and promote preventative measures for existing development in areas vulnerable to natural hazards.

Goal 2: Enhance Natural Systems

- Incorporate natural hazard mitigation planning and activities into watershed planning, natural resource management, natural systems enhancement, and land use planning to protect life, property, and ecological system.

Goal 3: Augment Emergency Services

- Strengthen emergency operations by enhancing communication, collaboration, and coordination of natural hazard mitigation activities and policies across agencies at all levels and regions of government, sovereign tribal nations, and the private sector.

Goal 4: Encourage Partnerships for Implementation

- Improve communication, coordination, and participation among and with public agencies, community members, community lifelines, and private sector organizations to prioritize and implement hazard mitigation activities and policies.
- Enhance efforts toward identifying and optimizing opportunities across state agencies, surrounding communities, and private entities for resource sharing, mutual aid, and funding sources/support.

Goal 5: Promote Public Awareness

- Build community resilience and awareness and reduce the effects of natural hazards and climate change through community-wide engagement, collaboration, resource-sharing, learning, leadership-building, and identifying mitigation project-related funding opportunities.

Goal 6: Advance Equity and Inclusion

- Mitigate the inequitable impacts of natural hazards by prioritizing the directing of resources and efforts to build resilience and engagement in the most vulnerable communities least able to prepare, respond, and recover.
- Strengthen efforts aimed at increasing engagement, outreach, and collaboration with community and cultural organizations and agencies that are dedicated to providing services and support to vulnerable and underserved communities.

NHMP Process, Participation, and Adoption

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

This CWD addendum was first developed in 2023. The Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Institute for Policy Research and Engagement (IPRE) collaborated with the Oregon Department of Emergency Management (OEM), and Clackamas County to update the Clackamas County multi-jurisdictional NHMP in 2019. CWD was not engaged in that process but utilized the outcomes of the historical efforts in the development of this NHMP Addendum. It is the intent of CWD to participate in the next County NHMP update and align with the County schedule.

The Clackamas County NHMP and CWD addendum are the result of a collaborative effort between District rate payers, citizens, elected officials, public agencies, non-profit organizations, the private sector, and regional organizations. Information contained in the County NHMP – Volumes I to III and the Community Wildfire Protection Plan was utilized in the development of this plan. The CWD Hazard Mitigation Action Committee (HMAC) was formed and guided the process of developing the District's NHMP. Development of the District's NHMP was completed by community volunteers and CWD board members.

Convener

The CWD Manager serves as the NHMP addendum convener. The convener of the NHMP addendum will take the lead in implementing, maintaining, and upgrading the addendum in collaboration with the designated convener of the Clackamas County NHMP (Clackamas County Resilience Coordinator).

Representatives from CWD's HMAC served as the project steering committee and met formally, and informally, to develop, review, and revise CWD's NHMP addendum with a focus on the NHMP's risk and resilience assessment and mitigation strategy (action items).

This addendum reflects decisions made at the designated meetings and during subsequent work and collaboration with Clackamas County. The CWD Addendum has been incorporated into Volume II of the County NHMP.

The CWD HMAC was comprised of the following representatives:

- Teresa Bricker, Board of Commissioners
- Ken Carroll, Board of Commissioners
- Pete Dorstert, Superintendent
- Todd Gary, Fire Chief, Colton Rural Fire Protection District #70
- Alan Gross, Board of Commissioners
- Betty Hodges, District Manager and Convener
- Carl Stephens, Board of Commissioners
- Colin Wait, Board of Commissioners

The HMAC served as the local review body for the NHMP.

NHMP Implementation and Maintenance

The CWD Board of Commissioners will be responsible for adopting the District’s addendum to the Clackamas County NHMP. This addendum designates the HMAC, and a convener to oversee the development, and implementation of action items. Because the CWD addendum is part of the County’s multi-jurisdictional NHMP, CWD will look for opportunities to partner with the County and other interdependent agencies and jurisdictions to mitigate common hazards and improve resilience in the community and region.

CWD’s HMAC will convene after adoption of CWD’s NHMP addendum on an annual schedule. The District convener will participate as requested by the County in order to provide opportunities for participating jurisdictions (cities and special districts) to identify opportunities for joint mitigation efforts and report on NHMP implementation, and maintenance. The District Manager will serve as the Water District convener and will be responsible for assembling the CWD HMAC.

The HMAC will be responsible for:

- Reviewing existing action items to determine suitability for funding
- Keeping elected officials, ratepayers and the public informed of the mitigation process
- Reviewing existing, and new risk assessment data to identify issues that may not have been identified at NHMP creation
- Educating and training new HMAC members on the NHMP, and mitigation actions in general
- Assisting in the development of funding proposals for priority action items
- Discussing methods for continued public involvement
- Evaluating effectiveness of the NHMP at achieving its purpose and goals (use Table 26, Volume I, Section 4, as one tool to help measure effectiveness)
- Documenting successes, and lessons learned during the year

The District will utilize the same implementation and maintenance process identified in Volume I, Section 4. The convener will remain active in the County’s implementation, maintenance process (Volume I, Section 4) and participate in the County HMAC meetings that occur.

The District will provide continued public participation during the plan maintenance process through periodic presentations to elected officials, public meetings, postings on social media, and/or through interactive content on the jurisdiction’s website (for more information see Volume I, Section 4).

The district will utilize the same action item prioritization process as the County (for more information see Volume I, Section 4 and Volume III, Appendix E).

Implementation through Existing Programs

This NHMP is strategic and non-regulatory in nature, meaning that it does not necessarily set forth any new policy. It does, however, provide: (1) a foundation for coordination and collaboration among agencies, the public, and the District; (2) identification and prioritization of future mitigation activities; and (3) aid in meeting federal planning requirements and qualifying for assistance programs.

The mitigation plan works in conjunction with other District plans and programs as well as the County Comprehensive Land Use Plan, Capital Improvement Plan (CIP), and building codes, as well as the Clackamas County NHMP, and the State of Oregon NHMP.

The mitigation actions described herein (and in Attachment A) are intended to be implemented through existing plans and programs within the District. Plans and policies already in existence have support from district residents, businesses, and policy makers. Where possible, the District will implement the NHMP's recommended actions through existing plans and policies. Many 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. Implementation opportunities are further defined in action items when applicable.

CWD has approximately 500 retail water service connections that serve the community within the service districts in an unincorporated portion of western Clackamas County. Comprehensive Planning takes place at the County level and relevant information is included in the County NHMP (Volume 1).

Capability Assessment

The Capability Assessment identifies and describes the ability of the CWD to implement the mitigation strategy and associated action items. Capabilities can be evaluated through an examination of broad categories, including: existing authorities, policies, programs, funding, and resources.

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Existing Authorities

Hazard mitigation can be executed at a local scale through three (3) methods: integrating hazard mitigation actions into other local planning documents (i.e., plan integration), adopting design standards and codes that account for best practices in structural hardening, and codifying mitigation into development requirements. The extent to which an authority, municipality, or multi-jurisdictional effort leverages these approaches is an indicator of that community's or organization's capabilities.

Governance Structure

CWD is governed by a five-member Board of Commissioners elected to alternating four-year terms by District voters. The Board of Commissioners, with support from the District's management team, and citizen engagement, define the District's vision, mission, goals, and strategic objectives, set policies, and approve the District's operating budget which reflects the outcomes of extensive planning efforts,

priorities, and action items developed with review and approval from citizen members of the budget committee.

Memorandum of Understanding Colton Water District/Colton RFPD #70, 2023

This memorandum between the CWD and the Colton Rural Fire Protection District was entered into to ensure there is enough potable water to meet the needs of CWD's customer base during any fire emergency either inside or outside of the water district boundary, avoid causing a public health hazard by using all the potable water, and coordinate efforts during declared fire emergencies.

Rules and Regulations

CWD Board of Directors rules and regulations that establish the conditions by which the District conducts its business and operations and how Customers may receive service. Existing policies that define service provision and address hazardous conditions provide a source of mitigation capability.

Structural Building Codes

The Oregon Legislature recently adopted updated building codes for both residential (2023 adoption) and commercial structures (2022) since the last update of this Plan. These building codes are based on the 2021 version of the International Building Code, International Fire Code, and International Existing Building Code.

The CWD falls under Clackamas County's Building Codes and Fire Code.

Board of Commissioners

The Board of Commissioners has the responsibility of developing and adopting the annual budget. Integrating hazard mitigation goals and projects into the annual budget in the future will be key to implementing the NHMP. The district does not levy any tax funds and relies strictly on water revenue from customer payments, new water meter hookups, and miscellaneous revenue to fund staffing and operations.

Programs & Projects

This Plan directs CWD and Clackamas County to explore integration into other planning documents and processes. Although the District has not previously been included in the County-wide NHMP, it has made progress in integrating the resilience efforts into its portfolio of planning programs and projects over the last five years.

Water System Master Plan (2012)

The *CWD Water System Master Plan (WSMP)*, completed in 2012, recommended expanding or replacing the current water treatment plant (constructed in 1981). This recommendation included seismic resiliency, replacement of the current filtration system with membrane filtration system, automated monitoring system, new chlorine system (replace chlorine gas system with sodium hypochlorite), and back-up power generation. The automated monitoring system will allow monitoring of plant operations without having to be onsite during emergencies.

An update of this plan is scheduled for within the next five years.

Community Wildfire Protection Plan (2024)

The Clackamas County Community Wildfire Protection Plan (CWPP) will be incorporated into this Plan as a functioning annex. The CWPP is expected to be adopted in early 2024.

Capital Improvements

- In 1996, a waterline replacement project was completed from the water treatment plant to the storage tank. In addition, sections of 6" asbestos-cement (AC) waterlines were replaced with 10" Polyvinyl chloride (PVC) pipe.
- In 2001, waterline replacement continued in several more sections of the service area. In addition, a new 318,000 gallon storage tank at the water treatment plant was constructed.
- In 2005, existing 6" PVC waterlines were replaced with 10" and 8" pipe.
- In 2022, an emergency generator was installed at the District's water treatment plant.
- In 2023, a 50,000 gallon tank for non-potable water for firefighting was brought online at the water treatment plant.
- In 2022, plans to develop a Water/fire Infrastructure Project began. This could involve the addition of a one-million-gallon storage tank for firefighting or development of infrastructure for additional non-potable water available for firefighting. Grant funding is currently being pursued for this project.

Future Projects

The District is developing a capital improvement fund for future projects identified in the Master Plan. Funds that had been going towards bond payments in the past now go towards future construction projects.

The District is currently exploring water infrastructure projects at \$5.7 million dollars or more, for which they will need to apply for grants. The list includes treatment plant upgrades in the amount of \$3.2 million and replacing waterline on Oswalt Road at \$2.5 million. Additional improvement projects include seismic upgrades, plant operations during power outages, improving the water intake on Jackson Creek, Jackson Creek water rights to prevent summer use restrictions, Canyon Creek water rights, upgrading additional water distribution lines to 10" and additional support for forest fire suppression.

Shared grant opportunities exist with Colton Rural Fire Protection District. These agencies could partner to develop grants for a water tank on Green Mountain Rd., upgrading the dead end four-inch transmission line, a 10,000-gallon tank at the Elwood fire station, and a 1,000,000-gallon seismic protected reservoir.

Personnel

The following District and Colton Rural Fire Protection District personnel have assignments related to natural hazard mitigation planning and implementation:

Emergency Management: CWD District Manager, CWD Superintendent, and Colton Rural Fire Protection District Chief

Public Information Officer: CWD District Manager, CWD Superintendent, and Colton Rural Fire Protection District Chief

Capital improvement planning: Colton Water Board of Commissioners

Capital improvement execution: Colton Water Board of Commissioners and CWD Staff

CWD does not have any employees solely designated to Emergency Management or Mitigation. They are a very small water district with two part-time employees. These personnel integrate hazards and

resilience planning into their greater work programs to the best of their abilities. There is limited capacity to expand upon their capabilities or work loads. CWD relies upon emergency management services from Colton RFPD #70 and Clackamas County.

Capital Resources

CWD has access to several capital resources that have important roles to play in the implementation of the natural hazard mitigation plan.

Communication Towers: Clackamas County 800mhz tower located on Goat Mountain

Critical facilities with power generators for use during emergency blackouts include: Water District Treatment Plant & Colton Fire Protection District Station

Warming or cooling shelters: Three Colton schools (grade school, middle school and high school); Colton Rural Fire Department

Community shelters: Three Colton churches, Camp Colton

Food pantries: Colton Helping Hands Food Bank, Colton Market, Colton Café, and Clyde & Bob’s 76

Fueling storage: Colton Market Fuel, Clyde and Bob’s 76 Station

Findings

Several important findings from this capability assessment informed the design of the Plan’s mitigation strategy and aided in prioritizing action items.

Staffing Limitations and Capacity

District staffing is severely limited. Employees are assigned hazard mitigation responsibilities as a (small) part of their larger job responsibilities. Restricted capacity reduces the breadth of the programming the agency can undertake in any year. The District relies upon its relationships with the County and the Fire District to expand its operations.

Reliance upon outside funding streams

CWD operates on a limited budget with many conflicting priorities. Current revenues are not enough to keep up with all the capital needs. Additionally, there are restrictions on many revenue sources in relation to where the funds may be spent. Grants and loans can provide revenue sources for large resilience projects and district planning.

Mitigation Strategy

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

The CWD’s mitigation strategy is comprised of the “Action Items”. Planning these action items involved the identification of hazards and risks, determination of probability and hazard impact, cost analysis, and project selection criteria. Those assessments along with historical events and the extensive wildfire damage of the 2020 Riverside wildfire amplified the recognition and need for increased public preparedness and improved system resilience through natural hazard mitigation.

Action Items

Table CWD-1 documents the title of each action along with, the lead organization, partners, timeline, cost, and potential funding resources. The HMAc prioritized action items to reflect current conditions (risk assessment), needs, and capacity. High priority actions are shown with orange highlight. The District will focus their attention, and resource availability, upon these achievable, high leverage, activities over the next five-years. Although this methodology provides a guide for the HMAc in terms of implementation, the HMAc has the option to implement any of the action items at any time. This option to consider all action items for implementation allows the committee to consider mitigation strategies as new opportunities arise, such as capitalizing on funding sources that could pertain to an action item that is not currently listed as the highest priority.



Photo Credit: Christy Hidalgo Photography

Table CWD-1 Action Items

Action Item #	Statement	Impacted Hazard									Implementation and Maintenance			
		Drought	Earthquake	Extreme Heat	Flood	Landslide	Volcanic Event	Wildfire	Windstorm	Winter Storm	Lead	Timeline	Potential Funding Source	Estimated Cost
1	<p>Replace Water Treatment Plant</p> <p>The current water treatment plant (constructed in 1981) needs to be replaced. This will include upgrades to ensure seismic resilience, fitting a new membrane filtration system, adding an automated monitoring system, new chlorine system, and back-up power generation.</p>	X	X	X	X			X		X	CWD Superintendent	Short	DEQ, FEMA HMA	High
2	<p>Replace Asbestos-cement Distribution Lines</p> <p>Replace approximately 3 miles of substandard 6" asbestos-cement (AC) distribution lines with 6" PVC pipe. This AC distribution line has become brittle with age and has played a major role in water loss due to leaks.</p>	X	X							CWD Superintendent	Medium	FEMA HMA, EPA	High	
3	<p>Improve Surface Raw Water Intake</p> <p>Improve the CWD's antiquated surface raw water intake to include a protective structure with a side inlet and intake water monitoring system. Intake is located in heavily wooded area on Jackson Creek. Storm debris is a serious issue that requires manual cleaning often in severe weather.</p>				X			X	X	X	CWD Superintendent	Short	Customer Fees, EPA, FEMA HMA	Low
4	<p>Water Loss Improvement</p> <p>CWD's <i>Water System Master Plan</i> dated 2012 sites a five-year water loss audit (2007-2012) that resulted in 23-30% water loss. Action item #2 and #6 are related to this project.</p>	X		X							CWD Superintendent	Ongoing	Customer Fees, EPA, FEMA HMA	Medium

Table CWD-1 Action Items

Action Item #	Statement	Impacted Hazard									Implementation and Maintenance			
		Drought	Earthquake	Extreme Heat	Flood	Landslide	Volcanic Event	Wildfire	Windstorm	Winter Storm	Lead	Timeline	Potential Funding Source	Estimated Cost
5	Water Storage Seismic Stability Replace two above ground water storage reservoirs (475,000 and 318,000 gallons) with seismically constructed tanks or replace both tanks with a one-million gallon seismically constructed tank. Inspection by Dyer Engineering concluded that neither storage tank can be upgraded to meet the current seismic safety standards as described in the 2022 Oregon Structural Specialty Code. Both tanks need to be replaced.		X								CWD Superintendent	Medium	Customer Fees, FEMA HMA	High
6	Water Meter Replacements CWD has approximately 500 mechanical water meters. Replacing these meters with digital meters with telemetry functionality meters will improve efficiency and conservation (identify leaks faster) and provide a safer and quicker meter reading without having to access customers' property.	X									CWD Superintendent	Medium	Customer Fees, EPA, FEMA HMA	Medium
7	Replace Substandard Fire Hydrants Upgrade all substandard fire hydrants within the district that do not meet adequate flow.							X			CWD Superintendent	Medium	Customer Fees, FEMA HMA	Low
8	New Storage Tank for Firefighting Install a new 60,000 gallon water storage tank on Canyon Creek and hydrant for non-potable water to be used for firefighting.	X						X			CWD Superintendent	Medium	Customer Fees, FEMA HMA	High

Table CWD-1 Action Items

Action Item #	Statement	Impacted Hazard									Implementation and Maintenance			
		Drought	Earthquake	Extreme Heat	Flood	Landslide	Volcanic Event	Wildfire	Windstorm	Winter Storm	Lead	Timeline	Potential Funding Source	Estimated Cost
9	Increase Pipe Size for Firefighting Flow Replace 13,860 feet of 4" PVC water distribution line with 6" PVC water distribution line for adequate firefighting flow.	X						X			CWD Superintendent	Long	FEMA HMA	High
10	Connect Dead-end Distribution Lines Install 4,100 feet of 6" pipe to connect (loop) dead-end distribution lines within the CWD. Dead-end distributions lines can lead to water stagnation, requires disinfectants, effects water pressure and requires manual flushing.							X			CWD Superintendent	Long	FEMA HMA	High
11	Expanded Water Rights CWD needs to pursue obtaining surface water rights to prevent summer use restrictions for Jackson and Canyon Creeks.	X						X			CWD Staff and Board of Commissioners	Short	Customer Fees	Low
12	Update the Water System Master Plan Existing 2012 plan must be updated to incorporate new understanding of hazards and current conditions of facilities and resources to meet projected growth through 2045.	X	X	X	X	X	X	X	X	X	CWD Staff and Board of Commissioners	Short	Customer Fees	Low

Source: Colton Water District NHMP HMA, 2023

Cost: Low (less than \$50,000), Medium (\$50,000-\$100,000), High (more than \$100,000)

Timing: Ongoing (continuous), Short (1-2 years), Medium (3-5 years), Long (5 or more years)

Priority Actions: Identified with orange highlight

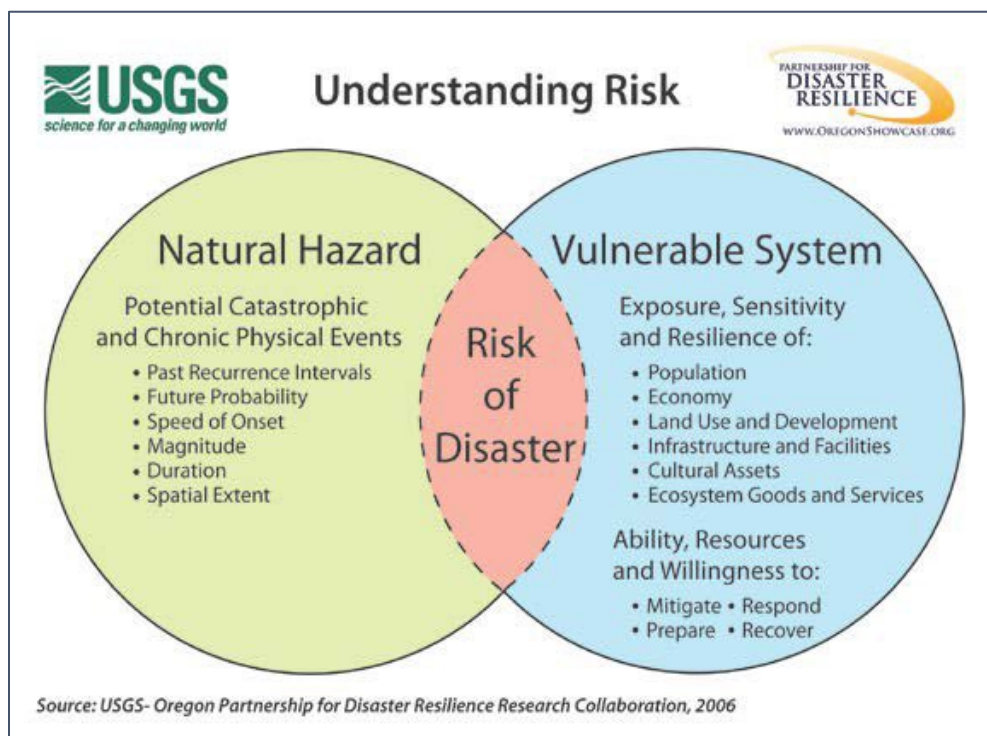
Risk Assessment

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 Volume I, Section 3 and Volume III, Appendix C. The risk assessment process is graphically depicted in Figure SA-1. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure CWD-3: Understanding Risk



Source: USGS- Oregon Partnership for Disaster Resilience Research Collaboration, 2006

Hazard Analysis

The CWD HMAAC developed their hazard vulnerability assessment (HVA), using the County’s HVA as a reference. Table CWD-2 shows the HVA matrix for CWD listing each hazard in order of rank from high to low. Conducting the hazard analysis is a useful step in planning for hazard mitigation, response, and recovery. The method provides the jurisdiction with a sense of hazard priorities but does not predict the occurrence of a hazard. One chronic hazard (wildfire) and two catastrophic hazards (Cascadia Subduction Zone earthquake and Crustal earthquake) rank as the top hazard threats to the District (Top Tier). Winter storm, extreme heat event, drought, and flood comprise the next highest ranked hazards (Middle Tier), while windstorm, volcanic event and landslide comprise the lowest ranked hazards (Bottom Tier).

Table CWD-2 Hazard Analysis Matrix

Hazard	History	Vulnerability	Maximum Threat	Probability	Total Threat Score	Hazard Rank	Hazard Tiers
Wildfire	18	35	80	56	189	1	Top Tier
Earthquake - Cascadia	2	45	100	35	182	2	
Earthquake - Crustal	6	50	100	21	177	3	
Winter Storm	12	30	70	49	161	4	Middle Tier
Extreme Heat Event	10	35	70	35	150	5	
Drought	10	15	50	56	131	6	
Windstorm	14	15	50	42	121	7	
Landslide	14	15	20	63	112	8	Bottom Tier
Flood	2	15	20	21	58	9	
Volcanic Event	2	10	20	7	39	10	

Source: CWD HMAAC, 2023.

Volume I, Section 2 of the Clackamas County NHMP thoroughly describes the characteristics of the profiled hazards, history, as well as the location, extent, and probability of potential events within the County. Generally, an event that affects the County, or applicable cities where the District facilities are located, is likely to affect the District as well. Similarly, the causes and characteristics of hazard events are appropriately described within Volume 1, Section 2 as well as the location and extent of potential hazards. Lastly, previous occurrences are well documented within Volume 1, Section 2 and the community impacts described by the County, or applicable City, would generally be the same for the District.

Community Characteristics

History

The CWD was established in 1920 with the purpose of serving a small number of residents in rural southeast Clackamas County, Oregon. The original system consisted of an infiltration gallery on Canyon Creek. In 1965, the District’s water source was moved to Jackson Creek for improved water quality. In 1981, a new treatment plant, distribution system improvements, and a new reservoir were constructed to serve the area.

Since the completion of the updated water system in 1981, the District has undertaken three major distribution improvement projects, which were based on the recommendations outlined in the District’s 1993 Colton Water Study.

- In 1996, a waterline replacement project was completed from the water treatment plant to the storage tank. In addition, sections of 6" asbestos-cement (AC) waterlines were replaced with 10" Polyvinyl chloride (PVC) pipe.
- In 2001, waterline replacement continued in several more sections of the service area. In addition, a new 318,000 gallon storage tank at the water treatment plant was constructed.
- The third project, completed in 2005, included replacement of existing 6" PVC waterlines with 10" and 8" pipe.

Transportation/Infrastructure

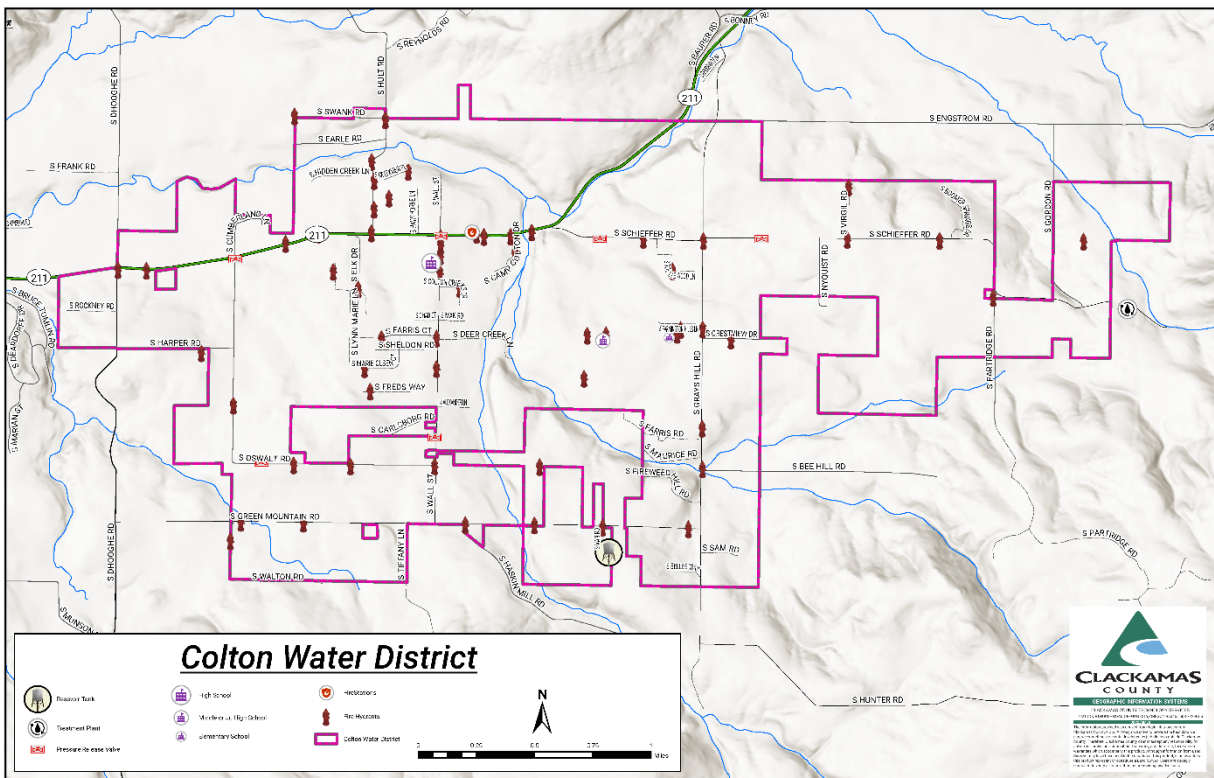
As an unincorporated area, Colton relies upon ODOT and Clackamas County for road/bridge maintenance. The primary highway is Oregon Hwy 211.

Economy

Colton is a small unincorporated community located in Clackamas County, Oregon on Oregon Hwy 211. There are a few small commercial/industrial businesses including: COLTONTEL, Colton Café, Colton Market, Clydes & Bob's 76, Wilcox, Colton Production, Helping Hands. In addition, Colton Rural Fire Protection District #70 protects 5,500 residents, seven businesses, three schools, and three community churches.

CWD has 500 customer connections (serving 1,500 people), 55 fire hydrants, and 18 miles of distribution pipe.

Figure CWD-1 Water Distribution System and Service Area



Source: Colton Water District, December 2023

Community Lifelines

This section outlines the resources, facilities, and infrastructure that, if damaged, could significantly impact the public safety, economic conditions, and environmental integrity of the District. [Community Lifelines](#) are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function. Mitigating these facilities will increase the community's resilience.

The community lifelines identified below were identified by CWD. This integrated network of assets, services, and capabilities are used day-to-day to support the recurring needs of the community and enable all other aspects of society to function. Decisive intervention (e.g., rapid re-establishment or employment of contingency response solutions) is required to maintain/reestablish these facilities and services following a hazard incident.

Critical Facilities

Facilities that are critical to response and recovery activities (i.e. life, safety, property, and environmental protection). These facilities include: 911 Centers, Emergency Operations Centers, Police, and Fire Stations, Public Works facilities, sewer, and water facilities, hospitals, bridges, roads, shelters, and more.

- Colton Water Treatment Plant, 23850 S Schieffer Road, Colton
 - Back-up Generator
- Reservoir #1 – Treatment Plant, 23850 S Schieffer Road, Colton
- Reservoir #2 – Van Road
- Water Diversion on Jackson Creek
- Pipelines/Distribution System

Fire Stations

- Colton Rural Fire Protection District #70, 20987 S Hwy 211, Colton

Potential Shelter Sites

Churches

- Colton Lutheran Parrish, 20858 S. Hwy 211 Colton
- Colton Community Church 21128 S Highway 211, Colton
- Canyon Creek Bible Fellowship 21302 S Highway 211, Colton

Schools

- Colton Elementary School, 30439 S Grays Hill Rd, Colton
- Colton Middle School, 21580 S Schieffer Rd, Colton
- Colton High School, 30205 S Wall St, Colton

Critical Infrastructure

Infrastructure that provides necessary services for emergency response include: Eighteen miles of water distribution lines that support 55 fire hydrants, Oregon State Hwy 211 and subsequent bridges.

Vulnerable Populations

Vulnerable populations, including seniors, disabled citizens, women, and children, as well as those people living in poverty, often experience the impacts of natural hazards and disasters more acutely. Populations that have special needs or require special consideration include childcare centers, schools, adult care centers, mobile home parks, and campgrounds.

Hazard Characteristics

Drought

The HMAC determined that the District’s probability for drought is **high** and that their vulnerability to drought is **low**.

Volume I, Section 2 describes the characteristics of drought hazards, history, as well as the location, extent and probability of a potential event. Due to the climate of Clackamas County, past and present weather conditions have shown an increasing potential for drought.

CWD is very concerned about drought in that it reduces the quantity of water available and increases the risk of wildfires. Drought contributed to the deadly Riverside Fire in 2020 that came very close to burning the community of Colton. Historical occurrences of drought have impacted operations and triggered water restriction for the community. CWD has been placed on water restrictions several times over the past few years. Wildfires have impacted CWD facilities and drained potable water stores to fight the fires.

Vulnerability Assessment

Due to insufficient data and resources, CWD is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard.

Future Projections

According to the Oregon Climate Change Research Institute “Future Climate Projections, Clackamas County,”¹ drought, as represented by low summer soil moisture, low spring snowpack, low summer runoff, and low summer precipitation, is projected to become more frequent in Clackamas County by the 2050s.

Increasingly frequent droughts will have economic and social impacts upon those who depend upon predictable growing periods (ranches, farms, vineyards, gardeners) as well as upon the price and availability of fresh vegetables. It may also stress local jurisdiction’s ability to provide water for irrigation or commercial and household use.

Earthquake (Cascadia Subduction Zone)

The HMAC determined that the District’s probability for a Cascadia Subduction Zone (CSZ) earthquake is **moderate** and that their vulnerability to a CSZ earthquake is **high**.

Volume I, Section 2 describes the characteristics of earthquake hazards, history, as well as the location, extent, and probability of a potential event. Generally, an event that affects the County is likely to affect CWD as well. The causes and characteristics of an earthquake event are appropriately described within Volume I, Section 2 as well as the location and extent of potential hazards. Previous occurrences are well

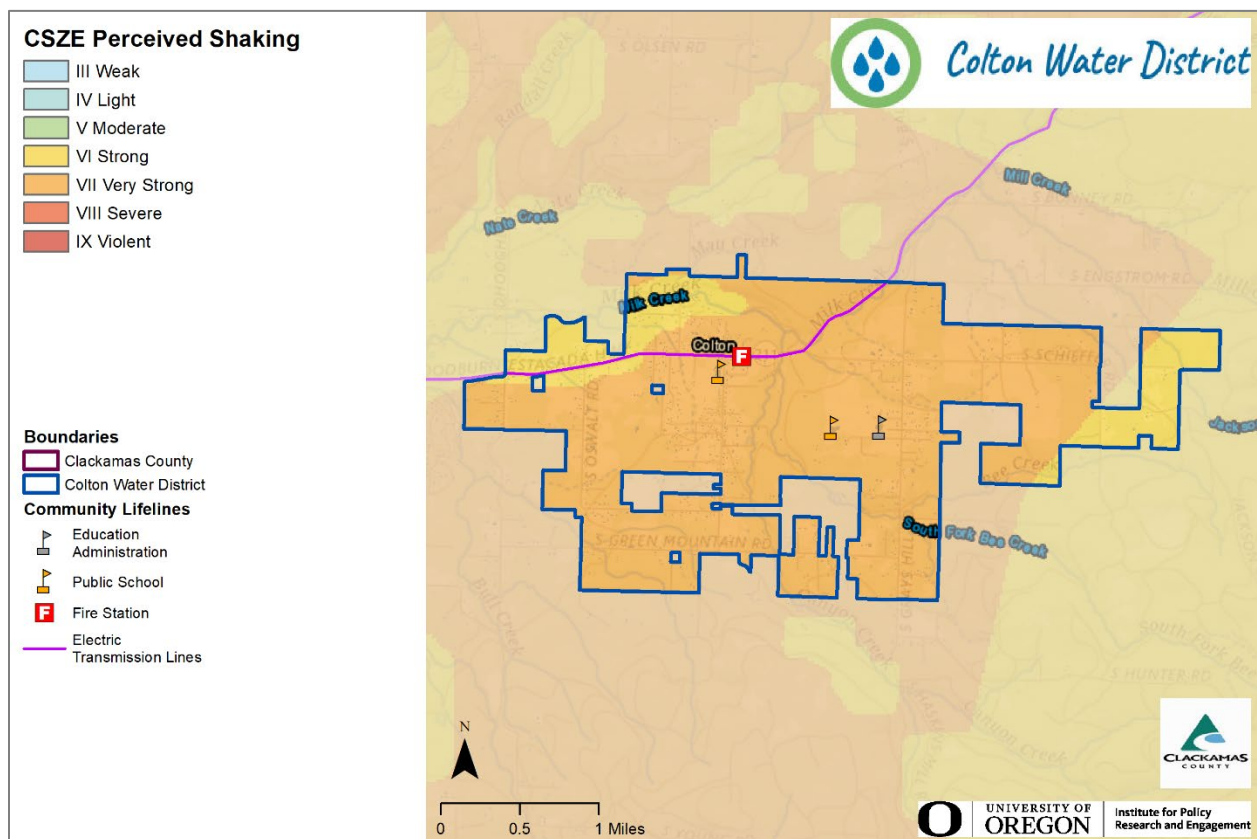
¹ Oregon Climate Change Research Institute, *Future Climate Projections, Clackamas County, Oregon*. February 2023.

documented within Volume I, Section 2 and the community impacts described by the County would generally be the same for CWD as well.

Within the Northern Willamette Valley/Portland Metro Region, three potential faults and/or zones can generate high-magnitude earthquakes. These include the Cascadia Subduction Zone, Gales Creek-Newberg-Mt Angel Structural Zone, Portland Hills Fault Zone, and the Canby-Molalla Fault Zone (discussed in the crustal earthquake section).

Figure CWD-2 displays relative shaking hazards from a Cascadia Subduction Zone earthquake event. As shown in the figure, most of the District is expected to experience very strong shaking (orange), while areas around the District will experience severe shaking (light red) (shown by the red northeast corner) in a CSZ event.

Figure CWD-2 Cascadia Subduction Zone Expected Shaking



Source: Map created by Oregon Partnership for Disaster Resilience.

Data: Oregon Department of Geology and Mineral Industries. Preparedness Framework Implementation Team (IRIS v3).

Note: To view hazard detail click this [link](#) to access Oregon HazVu

Cascadia Subduction Zone

The Cascadia Subduction Zone is a 680-mile-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continent at a rate of 4 cm per year. Scientists have found evidence that 11 large, tsunami-producing earthquakes have occurred off the Pacific Northwest coast in the past 6,000 years. These earthquakes took place roughly between 300 and

5,400 years ago with an average occurrence interval of about 510 years. The most recent of these large earthquakes took place in approximately 1700 A.D.²

The District's proximity to the Cascadia Subduction Zone, potential slope instability and the prevalence of certain soils subject to liquefaction and amplification combine to give the District a high-risk profile. Due to the expected pattern of damage resulting from a CSZ event, the Oregon Resilience Plan divides the State into four distinct zones and places the District predominately within the "Valley Zone" (Valley Zone, from the summit of the Coast Range to the summit of the Cascades). Within the Northwest Oregon region, damage and shaking is expected to be strong and widespread - an event will be disruptive to daily life and commerce and the main priority is expected to be restoring services to business and residents.

The District is not within the severe shaking area, though there is significant area around the area that have severe and very severe shaking if a large earthquake were to occur. These areas include Highway 211, which could result in Colton having access issues from emergency vehicles and other response efforts. There have been instances of water lines and facilities impacted by earthquake induced landslides within the County.

Earthquake (Crustal)

The HMAC determined that the District's probability for a crustal earthquake is **low** and that their vulnerability to crustal earthquake is **high**.

Volume I, Section 2 describes the causes and characteristics of earthquake hazards, history, as well as the location, extent, and probability of a potential event. Generally, an event that affects the County is likely to affect CWD as well. Figure CWD-3 shows a generalized geologic map of the Colton area that includes the areas for potential regional active faults, earthquake history (1971-2008), and soft soils (liquefaction) hazard. The figure shows the areas of greatest concern within the District limits as red and orange.

Crustal faults are located within Clackamas County and therefore CWD is vulnerable to crustal earthquakes.

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 site. In many major earthquakes, damages have primarily been caused by the behavior of the soil.

The Canby-Molalla Fault and Portland Hills Fault Zone can generate high- magnitude earthquakes. Historical records count over 56 earthquakes in the Portland-metro area. The more severe ones occurred in 1877, 1880, 1953 and 1962. The most recent severe earthquake was the March 25, 1993, Scotts Mills quake. It was a 5.6 magnitude quake with aftershocks continuing at least through April 8.

Canby-Molalla Fault Zone

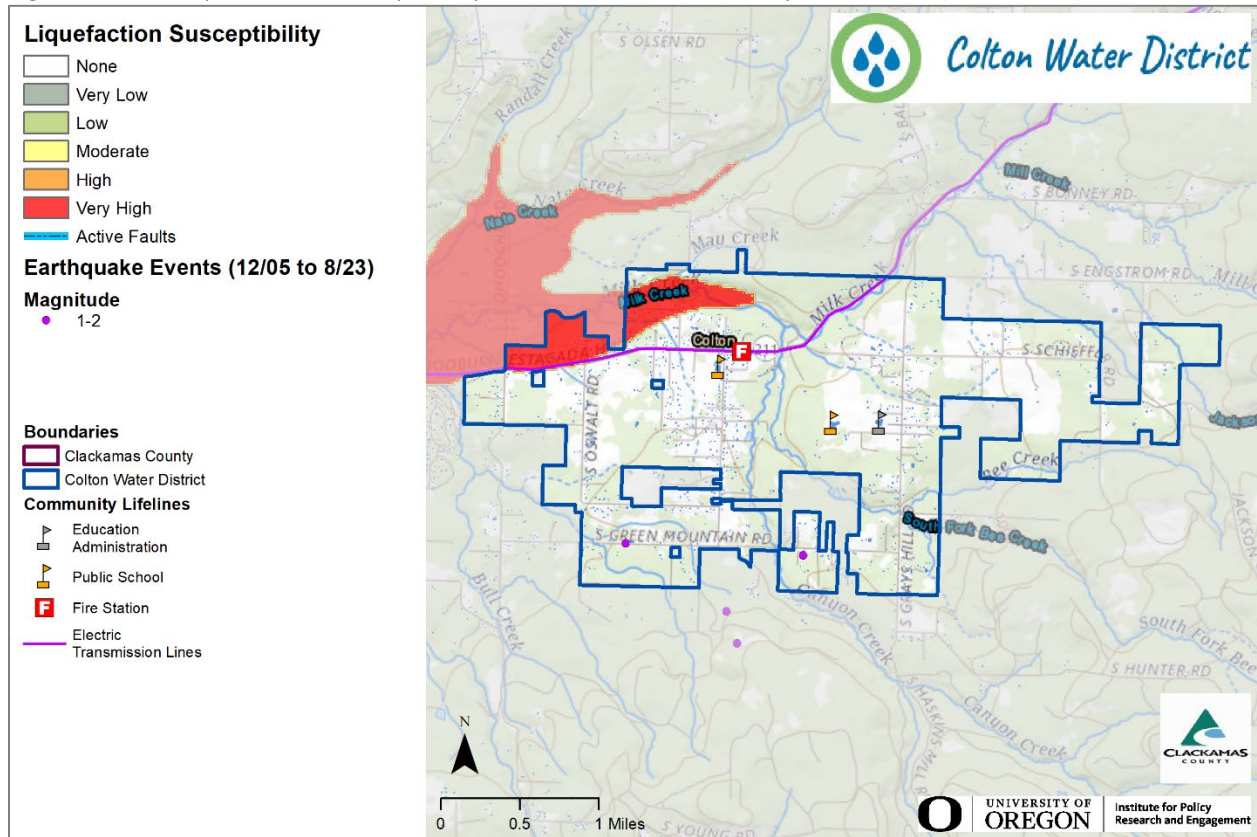
The Canby-Molalla Fault Zone is a series of NE-trending fault that vertically displace the Columbia River Basalt with discontinuous aeromagnetic anomalies that represent significant offset of Eocene basement and volcanic rocks. The fault zone extends for 31 miles from the vicinity of Tigard south through the towns of Canby and Molalla in northern Oregon.

² The Cascadia Region Earthquake Workgroup, 2005. Cascadia Subduction Zone Earthquakes: A magnitude 9.0 earthquake scenario. <http://www.crew.org/PDFs/CREWSubductionZoneSmall.pdf>

Portland Hills Fault Zone

The Portland Hills Fault Zone is a series of NW-trending faults that vertically displace the Columbia River Basalt by 1,130 feet and appear to control thickness changes in late Pleistocene (approx. 780,000 years ago) sediment. The fault zone extends along the eastern margin of the Portland Hills for 25 miles and lies northeast of Colton.

Figure CWD-3 Liquefaction Susceptibility, Active Faults, and Earthquake Events (2005-2023)



Source: Map created by Oregon Partnership for Disaster Resilience.

Data: Oregon Department of Geology and Mineral Industries. Preparedness Framework Implementation Team (IRIS v3).

Note: To view hazard detail click this [link](#) to access Oregon HazVu

Vulnerability Assessment

In 2018 the Department of Geology and Mineral Industries (DOGAMI) completed a regional impact analysis for earthquakes originating from the Cascadia Subduction Zone and Portland Hills faults ([O-18-02](#)). Findings from that report are provided in Volume 1.

Seismic building codes were implemented in Oregon in the 1970s; however, stricter standards did not take effect until 1991 and early 2000s. As noted in the profile, approximately 90% of the District's facilities and pipes were built or installed prior to 1990, which increases the District's vulnerability to the earthquake hazard.

Future Projections

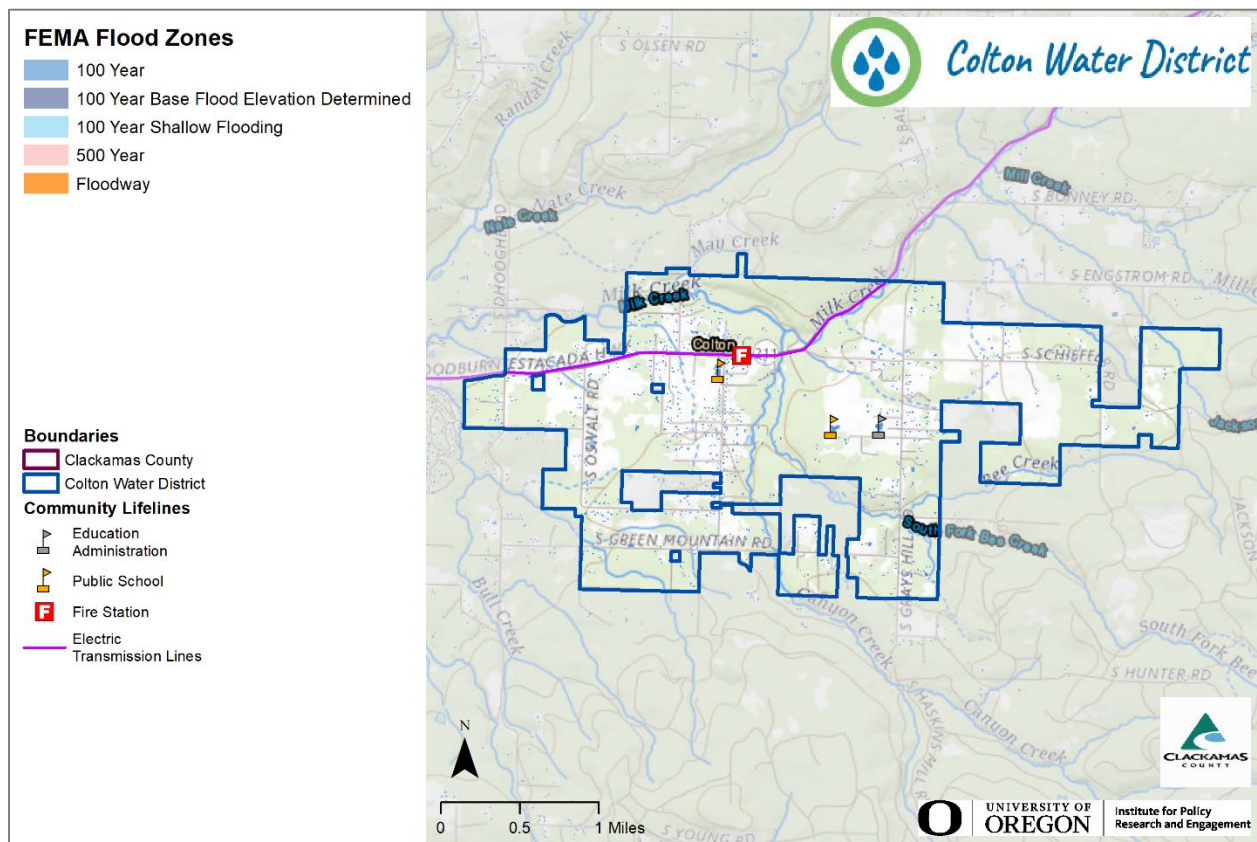
Future development (residential, commercial, or industrial) within Clackamas County will be at risk to earthquake impacts, although this risk can be mitigated by the adoption and enforcement of high development and building standards. Reducing risks to vulnerable populations should be considered during the redevelopment of existing properties.

Flood

The HMAC determined that the District’s probability of flooding is **low** and that their vulnerability to flooding is **low**.

Volume I, Section 2 describes the characteristics of flood hazards, history, as well as the location, extent, and probability of a potential event. Figure CWD-4 illustrates the flood hazard area for CWD.

Figure CWD-4 FEMA Flood Zones



Source: Map created by Oregon Partnership for Disaster Resilience.

Data: Oregon Department of Geology and Mineral Industries. Preparedness Framework Implementation Team (IRIS v3).

Note: To view hazard detail click this [link](#) to access Oregon HazVu

Vulnerability Assessment

CWD assets are in an area that has an overall low susceptibility to flooding.

Floods can have a devastating impact on almost every aspect of the community, including private property damage, public infrastructure damage, and economic loss from business interruption. It is important for the District to be aware of flooding impacts and assess its level of risk.

The economic losses due to business closures often total more than the initial property losses that result from flood events. Business owners and their employees are significantly impacted by flood events. Direct damages from flooding are the most common impacts, but indirect damages, such as diminished clientele, can be just as debilitating to a business.

For mitigation planning purposes, it is important to recognize that flood risk for a community is not limited only to areas of mapped floodplains. Other portions of Colton outside of the mapped floodplains

may also be at relatively high risk from over bank flooding from streams too small to be mapped by FEMA or from local storm water drainage.

The extent of flooding hazards in the CWD primarily depends on climate and precipitation levels. Additionally, withdrawals for irrigation and drinking water, as well as stream and wetland modifications or vegetation removal can influence water flow.

Future Projections

According to the Oregon Climate Change Research Institute “Future Climate Projections, Clackamas County,”³ winter flood risk at mid- to low elevations in Clackamas County, where temperatures are near freezing during winter and precipitation is a mix of rain and snow, is projected to increase as winter temperatures increase. The temperature increase will lead to an increase in the percentage of precipitation falling as rain rather than snow. The projected increases in total precipitation, and in rain relative to snow, likely will increase flood magnitudes in the region. Vulnerable populations adjacent to floodways (including the unhoused, manufactured home communities, and campground occupants) will be more at risk as the winter flood risk increases.

Landslide

The HMAC determined that the District’s probability for landslide is **high** and that their vulnerability to landslide is **low**.

Volume I, Section 2 describes the characteristics of landslide hazards, history, as well as the location, extent, and probability of a potential event within the region. CWD assets are located in a heavily forested, mountain area. Recent wildfires and continued logging operations present a substantial risk of landslides.

Landslide susceptibility exposure for CWD is shown in Figure CWD-5. Most of CWD demonstrates a moderate to high landslide susceptibility exposure. There are no areas within CWD that have very high landslide susceptibility exposure. There are a large number of high landslide susceptibility exposure areas in the forested hills to the southeast.

Note that even if a jurisdiction has a high percentage of area in a high or very high landslide exposure susceptibility zone, this does not mean there is a high risk, because risk is the intersection of hazard, and assets.

Vulnerability Assessment

DOGAMI completed a statewide landslide susceptibility assessment in 2016 ([O-16-02](#)).

Potential landslide-related impacts are adequately described within Volume I, Section 2, and include infrastructure damages, economic impacts (due to isolation, and/or arterial road closures), property damages, and obstruction to evacuation routes. Rain-induced landslides, and debris flows can potentially occur during any winter, and thoroughfares beyond district boundaries are susceptible to obstruction as well.

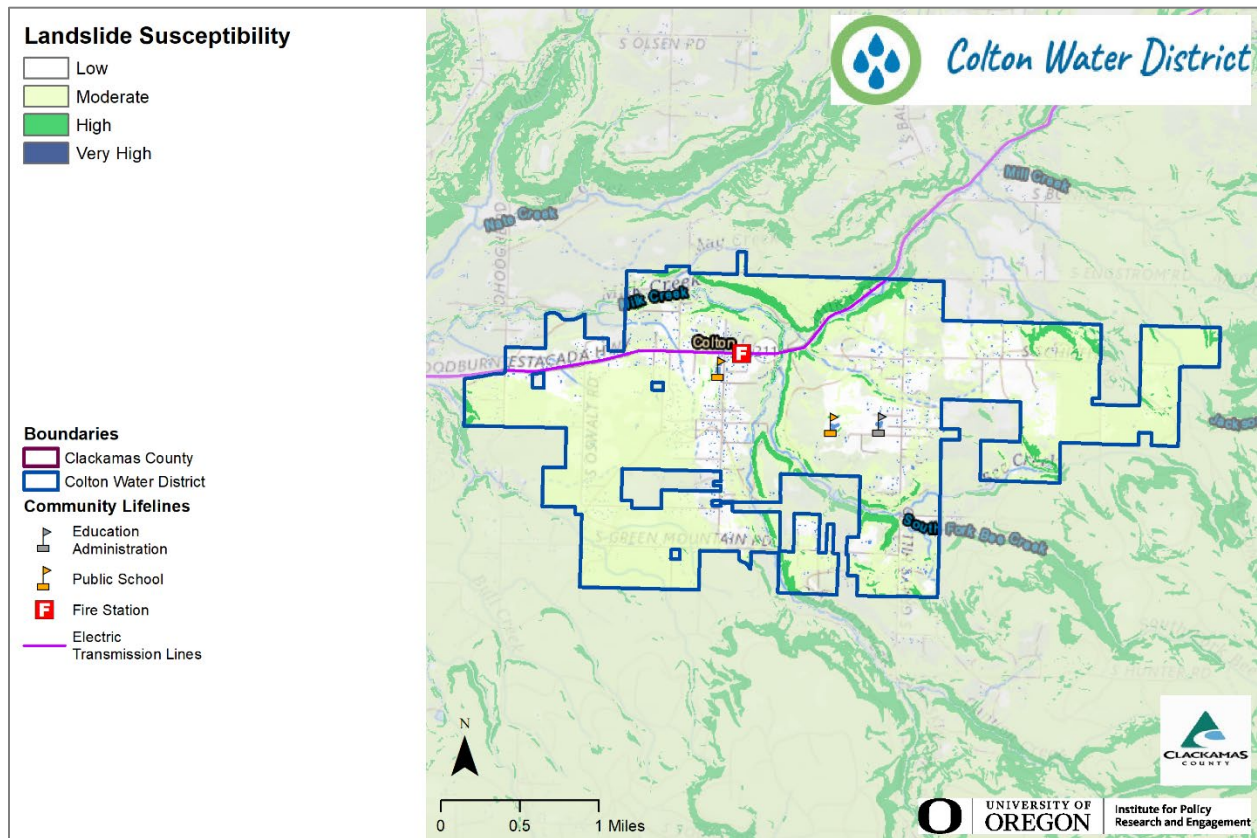
The most common type of landslides are slides caused by erosion. Slides move in contact with the underlying surface, are generally slow moving, and can be deep. Rainfall-initiated landslides tend to be smaller; while earthquake induced landslides may be quite large. All soil types can be affected by natural landslide triggering conditions.

³ Oregon Climate Change Research Institute, *Future Climate Projections, Clackamas County, Oregon*. February 2023.

Future Projections

Landslides are often triggered by rainfall when the soil becomes saturated. As a surrogate measure of landslide risk, the Oregon Climate Change Research Institute report presents a threshold based on recent precipitation (cumulative precipitation over the previous 3 days) and antecedent precipitation (cumulative precipitation on the 15 days prior to the previous 3 days). By the 2050s under the higher emissions scenario, the average number of days per year in Clackamas County on which the landslide risk threshold is exceeded is not projected to change substantially. However, landslide risk depends on multiple factors, and this metric, which is based on precipitation, does not reflect all aspects of the hazard. Additional triggers, such as earthquakes, wildfires, or development, can increase risks of landslides. Future development along slopes or adjacent to riverbanks will be a greater risk of impact from this hazard.

Figure CWD-5 Landslide Susceptibility Exposure



Source: Map created by Oregon Partnership for Disaster Resilience.

Data: Oregon Department of Geology and Mineral Industries. Preparedness Framework Implementation Team (IRIS v3).

Note: To view hazard detail click this [link](#) to access Oregon HazVu

Severe Weather

Severe weather can account for a variety of intense, and potentially damaging hazard events. These events include extreme heat, windstorms, and winter storms. The following section describes the unique probability, and vulnerability of each identified weather hazard.

Extreme Heat

The HMAC determined that the District's probability for extreme heat events is **moderate** and that their vulnerability is **moderate**.

Volume I, Section 2 describes the characteristics of extreme heat, history, as well as the location, extent, and probability of a potential event within the region. Generally, an event that affects the County is likely to affect the District as well.

A severe heat episode or "heat wave" occurs about every two to three years, and typically lasting two to three days but can last as many as five days. A severe heat episode can be defined as consecutive days of upper 90s to around 100. Severe heat hazard in the Portland metro region can be described as the average number of days with temperatures greater than or equal to 90-degrees, or 100-degrees, Fahrenheit. On average the region experiences 13.6 days with temperatures above 90-degrees Fahrenheit, and 1.4 days above 100-degrees Fahrenheit, based on new 30-year climate averages (1981-2010) from the National Weather Service – Portland Weather Forecast Office.

Extreme heat produced by complex heat domes are a recent feature of the weather in the Pacific Northwest. The recent heat dome recorded in 2021 stressed communities, infrastructure, crops, and caused additional drying of forestlands already dry from drought conditions. Demand for water surges during these events.

CWD has not experienced any life-threatening consequences from the few historical extreme heat events. However, changes in climate indicate that the area should expect to see more extreme heat events.

Future Projections

According to the Oregon Climate Change Research Institute "Future Climate Projections, Clackamas County,"⁴ the number, duration, and intensity of extreme heat events will increase as temperatures continue to warm. In Clackamas County, the number of extremely hot days (days on which the temperature is 90°F or higher) and the temperature on the hottest day of the year are projected to increase by the 2020s and 2050s under both the lower (RCP 4.5) and higher (RCP 8.5) emissions scenarios. The number of days per year with temperatures 90°F or higher is projected to increase by an average of 12 (range 3–21) by the 2050s, relative to the 1971–2000 historical baselines, under the higher emissions scenario. The temperature on the hottest day of the year is projected to increase by an average of about 7°F (range 2–11°F) by the 2050s. Higher temperatures and longer/more extreme heat events will have negative impacts upon vulnerable populations such as those over 65+, children, those living in older or temporary housing, and field workers.

Windstorm

The HMAC determined that the District's probability for windstorm is **moderate** and that their vulnerability to windstorm is **low**.

Volume I, Section 2 describes the characteristics of windstorm hazards, history, as well as the location, extent, and probability of a potential event within the region. Because windstorms typically occur during winter months, they are sometimes accompanied by flooding and winter storms (ice, freezing rain, and very rarely, snow). Other severe weather events that may accompany windstorms, including thunderstorms, hail, lightning strikes, and tornadoes are generally negligible for CWD.

Volume I, Section 2 describes the impacts caused by windstorms, including power outages, downed trees, heavy precipitation, building damages, and storm-related debris. Additionally, transportation, and economic disruptions result as well.

⁴ Oregon Climate Change Research Institute, *Future Climate Projections, Clackamas County, Oregon*. February 2023.

Damaging high-speed windstorms have been recorded in the area. Historical annual high-wind events have caused temporary and multi-day power outages. Damage from high winds generally has resulted in downed utility lines, and trees usually limited to several localized areas. Electrical power can be out anywhere from a 24-48 hours to a week. Outdoor signs have also suffered damage. If the high winds are accompanied by rain (which they often are), blowing leaves, and debris clog drainage-ways, which in turn may cause localized urban flooding.

Future Projections

Limited research suggests little if any change in the frequency and intensity of windstorms in the Northwest as a result of climate change. Those impacted by windstorms at present, including older residential or commercial developments with above-ground utilities, poor insulation or older construction, heavy tree canopies, or poor storm drainage, will continue to be impacted by windstorms in the future.



Photo Credit: KPTV News

Winter Storm (Snow/Ice)

The HMAC determined that the District’s probability for winter storm is **moderate** and that their vulnerability to winter storm is **moderate**.

Volume I, Section 2 describes the characteristics of winter storm hazards, history, as well as the location, extent, and probability of a potential event within the region. Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting the District typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from November through March.

Freezing temperatures, ice and/or snow that cause damage to pipes and other assets have been recorded in the area. Recent snow and ice storms occurred in 1978, 1998, 2004, 2017, 2019, and 2021. The 2021 storm left lots of trees and power lines down blocking roads. Typical impacts include frozen meters and sensing lines, and ruptured pipes and short term power outages typically last less than 24 hours.

Most winter storms typically do not cause significant damage; however, they are frequent, and have the potential to impact economic activity. Road closures due to winter weather are an uncommon occurrence but can interrupt commuter, and commercial traffic as noted above.

Vulnerability Assessment

Due to insufficient data and resources, CWD is currently unable to perform a quantitative risk assessment, or exposure analysis, for the extreme heat, windstorm, and winter storm hazards.

Future Projections

According to the Oregon Climate Change Research Institute “Future Climate Projections, Clackamas County,”⁵ cold extremes will become less frequent and intense as the climate warms. In Clackamas County, the number of cold days (maximum temperature 32°F or lower) per year is projected to decrease by an average of 6 (range -3– -8) by the 2050s, relative to the 1971–2000 historical baselines, under the higher emissions scenario. The temperature on the coldest night of the year is projected to increase by an average of 6°F (range 0– 11°F) by the 2050s.

The intensity of extreme precipitation is expected to increase as the atmosphere warms and holds more water vapor. In Clackamas County, the number of days per year with at least 0.75 inches of precipitation is not projected to change substantially. However, by the 2050s, the amount of precipitation on the wettest day and wettest consecutive five days per year is projected to increase by an average of 15% (range 0–31%) and 10% (range -1–26%), respectively, relative to the 1971–2000 historical baselines, under the higher emissions scenario.

Vulnerable populations will be more likely to experience the negative impacts of winter storms in the future, particularly the unhoused and the elderly.

Volcanic Event

The HMAC determined that the District’s probability for a volcanic event is **low** and that their vulnerability to a volcanic event is **low**.

Volume I, Section 2 describes the characteristics of volcanic event hazards, history, as well as the location, extent, and probability of a potential event within the region. CWD is located near two active volcanoes;

⁵ Oregon Climate Change Research Institute, *Future Climate Projections, Clackamas County, Oregon*. February 2023.

Mount Hood and Mount St. Helens. CWD's assets are not in an area susceptible to volcanic proximity hazards (lava flow, and lahars etc.); however CWD's assets are subject ash fall. Upstream lahars are not expected on Jackson Creek since there is no direct access to volcanos in the upper watershed.

Vulnerability Assessment

Due to the District's relative distance from volcanoes, CWD is unlikely to experience the immediate effects that eruptions have on surrounding areas (i.e., mud and debris flows, or lahars). Depending on wind patterns and which volcano erupts, however, the District may experience ashfall. The eruption of Mount St. Helens in 1980, for example, coated the Willamette Valley with a fine layer of ash. If Mount Hood erupts, however, the District could experience a heavier coating of ash.

Future Projections

Although the science of volcano predictions is improving, it remains challenging to predict a potential volcanic event. Ash fall, which will be the greatest impact, will impact the entire County. Impacts will be felt hardest by property managers (ranches, farmers, etc.) and by those relying upon clean surface water (for drinking water production and irrigation).

Wildfire

The HMAC determined that the District's probability for wildfire is **high**, and that their vulnerability to wildfire is **moderate**.

The Clackamas County Community Wildfire Protection Plan (CWPP) is hereby incorporated into this NHMP addendum by reference, and it will serve as the wildfire section for this addendum. The following presents a summary of key information; refer to the full CWPP for a complete description, and evaluation of the wildfire hazard. Information specific to CWD is found in the following chapter: Chapter 9.9: Colton Rural Fire Protection District #70.

Volume I, Section 2 describes the characteristics of wildland fire hazards, history, as well as the location, extent, and probability of a potential event within the region. The location, and extent of a wildland fire vary depending on fuel, topography, and weather conditions.

Weather and urbanization conditions are primarily at cause for the hazard level. CWD has not experienced a wildfire within its limits, but the District has abundant wooded areas that are a concern in the case of a wildfire event. CWD is in a mountainous and heavily forested area; therefore, at high risk for natural or human caused wildfire. The mountainous topography along with abundant fuel (vegetation) and weather contributed to the two most recent fires: 36 Pit Fire in 2014, the Unger Road Fire and the Riverside Fire in 2020. Figure CWD-6 shows wildfire risk in CWD and Figure CWD-7 shows wildfire risk and large fire history including the 2020 Riverside and Unger Rd fires.

Clackamas County has two major physiographic regions: the Willamette River Valley in western Clackamas County and the Cascade Range Mountains in eastern and southern Clackamas County. The Willamette River Valley is the most heavily populated portion of the county and is characterized by flat or gently hilly topography. The Cascade Range has a relatively small population and is characterized by heavily forested slopes. Eastern Clackamas County is at higher risk to wildfire than western portions of the county due to its dense forest land. Human caused fires are responsible for most fires in Clackamas County.

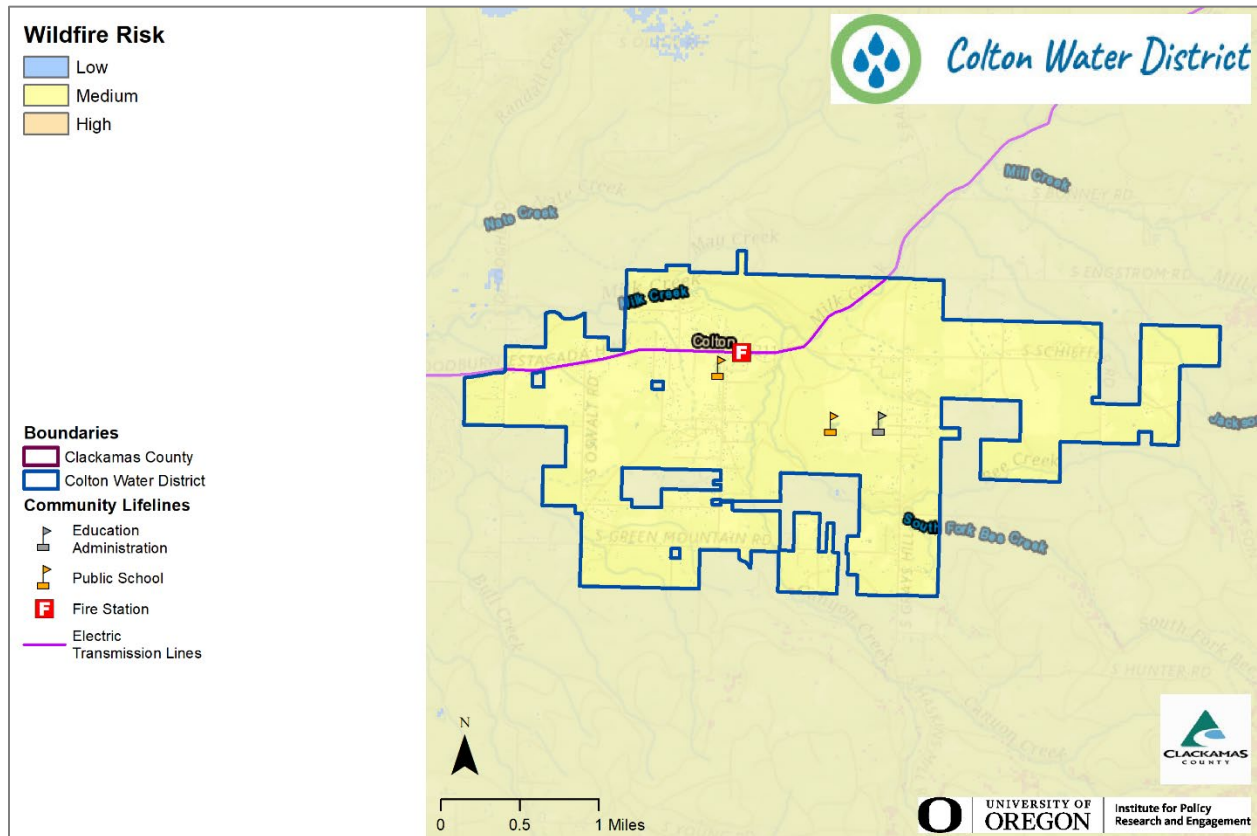
Vulnerability Assessment

The potential community impacts, and vulnerabilities described in Volume I, Section 2 are generally accurate for the Water District as well. Colton Fire District's fire response is addressed within the CWPP which assesses wildfire risk, maps wildland urban interface areas, and includes actions to mitigate wildfire

risk. The District will update their wildfire risk assessment if the fire plan presents better data during future updates (an action item is included to participate in future updates to the CWPP).

Property can be damaged or destroyed with one fire as structures, vegetation, and other flammables easily merge to become unpredictable, and hard to manage. Other factors that affect ability to effectively respond to a wildfire include access to the location, and to water, response time from the fire station, availability of personnel, and equipment, and weather (e.g., heat, low humidity, high winds, and drought).

Figure CWD-6 Wildfire Risk



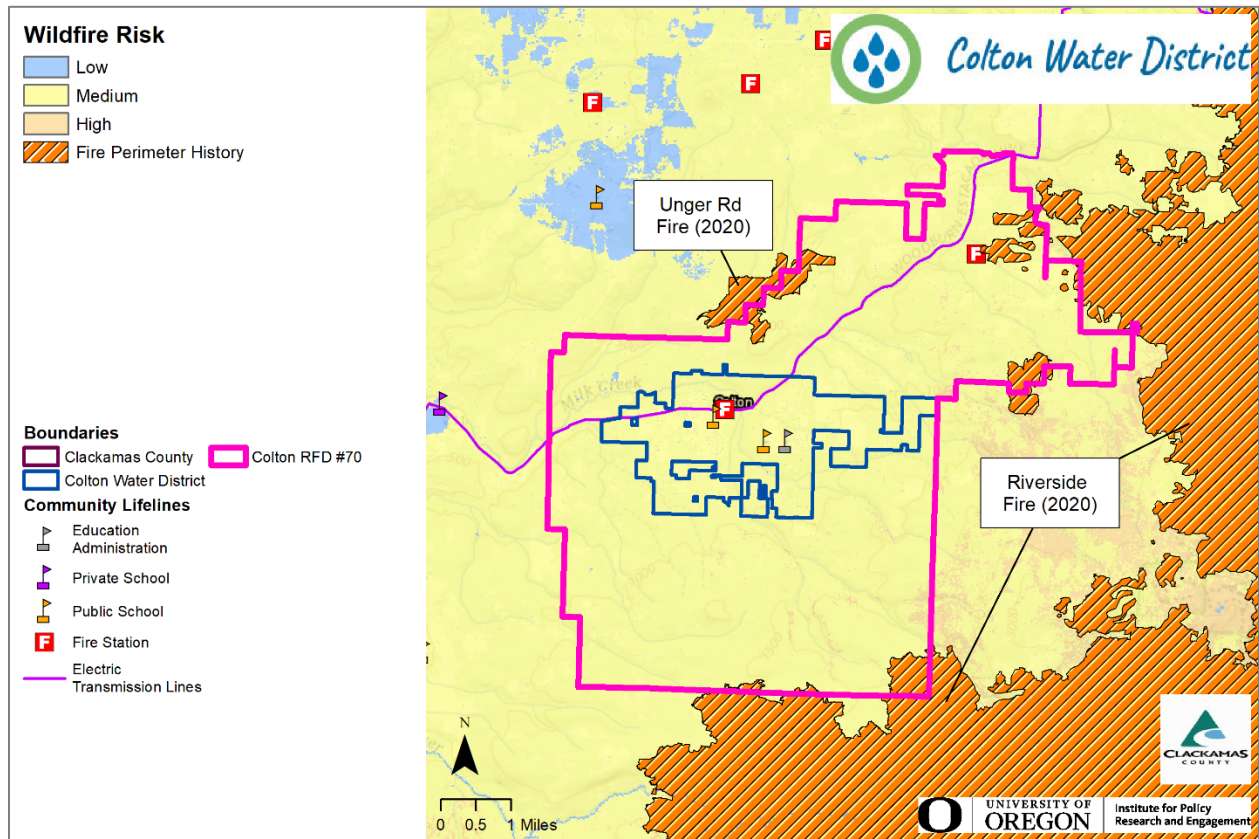
Source: Map created by Oregon Partnership for Disaster Resilience.
 Data: Oregon statewide wildfire risk map created by Oregon State University (unpublished). Preparedness Framework Implementation Team (IRIS v3).
 Note: To view additional wildfire risk information click this [link](#) to access Oregon Explorer’s CWPP Planning Tool

Future Projections

According to the Oregon Climate Change Research Institute “Future Climate Projections, Clackamas County,”⁶ wildfire frequency, intensity, and area burned are projected to continue increasing in the Northwest. Wildfire risk, expressed as the average number of days per year on which fire danger is very high, is projected to increase in Clackamas County by 14 (range -6– 34) by the 2050s, relative to the historical baseline (1971–2000), under the higher emissions scenario. Similarly, the average number of days per year on which vapor pressure deficit is extreme is projected to increase by 29 (range 10–44) by the 2050s. Communities at risk to wildfire include those within the urban wildfire interface or along river or creek corridors, where fire can travel quickly. Communities will need to address growing wildfire risks if populations are not restricted from expanding further into higher risk areas.

⁶ Oregon Climate Change Research Institute, *Future Climate Projections, Clackamas County, Oregon*. February 2023.

Figure CWD-7 Wildfire Risk and Large Fire History



Source: Map created by Oregon Partnership for Disaster Resilience.

Data: Oregon statewide wildfire risk map created by Oregon State University (unpublished). Preparedness Framework Implementation Team (IRIS v3).

Note: To view additional wildfire risk information click this [link](#) to access Oregon Explorer's CWPP Planning Tool



Photo Credit: Teresa Bricker

Attachment A: Public Involvement Summary

Members of the steering committee provided edits and updates to the NHMP prior to the public review period as reflected in the final document.

To provide the public information regarding the draft NHMP addendum, and provide an opportunity for comment, an announcement (see below) was provided from January 31 through February 29, 2024 on the District's website and the Molalla Pioneer. The plan was also posted and announced on the County's website. There were no comments provided. Additional opportunities for stakeholders and the public to be involved in the planning process are addressed in Volume III, Appendix B.

A diverse array of agencies and organizations were provided an opportunity to provide input to inform the plan's content through a variety of mechanisms including the opportunity for comment on the draft plan. The agencies and organizations represent local and regional agencies involved in hazard mitigation activities, those that have the authority to regulate development, neighboring communities, representatives of businesses, academia, and other private organizations, and representatives of nonprofit organizations, including community-based organizations, that work directly with and/or provide support to underserved communities and socially vulnerable populations. For more information on the engagement strategy see Volume III, Appendix B.

Website Posting

Colton Water District seeks additional public input on their addendum to the Clackamas County Natural hazards Mitigation Plan

Clackamas County Molalla

Posted on February 14, 2024

Colton Water District is in the process of developing their Natural Hazards Mitigation Plan (NHMP). This work is being performed in cooperation with the University of Oregon's Institute for Policy Research and Engagement – Oregon Partnership for Disaster Resilience and the Oregon Department of Emergency Management (OEM) utilizing funds obtained from the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program. With re-adoption of the plan, CWD will gain eligibility to apply for federal funding towards natural hazard mitigation projects. This local planning process includes a wide range of representatives from city, special districts, and county government, emergency management personnel, and outreach to members of the public. A natural hazards mitigation plan provides communities with a set of goals, action items, and resources designed to reduce risk from future natural disaster events. 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. An electronic version of the updated draft of the Colton Water District NHMP addendum will be available for formal public comment beginning January 31, 2024. To view the draft, please visit the Colton Water District website. If you have any questions regarding the Colton Water District NHMP addendum or the update process in general, please contact: Betty Hodges, Colton Water District Manager at (503) 824-2500 or email at bh@coltonwater.org; or Michael Howard, Director for the Oregon Partnership for Disaster Resilience at (541) 346-8413 or mrhoward@uoregon.edu. Publish February 14, 2024 MOP316774

HMAC

The Hazard Mitigation Advisory Committee (HMAC) members possessed familiarity with the community and how it is affected by natural hazard events. The HMAC guided the development process through several steps including goal confirmation and prioritization, action item review and development, and information sharing, to develop the NHMP and to make the NHMP as comprehensive as possible. The HMAC met formally on the following dates (additional meetings were held with the County on February 17, June 14, 2023 and January 9, 2024):

Meeting #1: March 21 and April 7, 2023

During this meeting, the HMAC:

- Reviewed the previous Clackamas County NHMP, and were provided updates on hazard mitigation planning, the NHMP development and update process, and project timeline.
- Provided recent history of hazard events in the district.
- Reviewed and confirmed the County NHMP's mission and goals.
- Reviewed and provided feedback on the draft risk assessment update including community vulnerabilities and hazard information.
- Provided mitigation strategies (actions).
- Reviewed the implementation and maintenance program.
- Discussed the NHMP public outreach strategy.

Meeting #2: November 16, 2023 (via remote conference)

During this meeting, the HMAC:

- Confirmed and provided feedback on the final draft risk assessment update including community vulnerabilities and hazard information provided by DOGAMI (Risk Report).
- Reviewed and confirmed the district's capabilities assessment.
- Reviewed, confirmed, and prioritized the District's mitigation strategies.