



MEMORANDUM

EUGENE WATER & ELECTRIC BOARD

Rely on us.

TO: Commissioners Barofsky, Schlossberg, Brown, Carlson, and Morris

FROM: Sarah Gorsegner, Business Continuity Manager; Jeannine Parisi, Strategic Program Manager

DATE: May 6, 2025

SUBJECT: EWEB Annex to the Lane County Multi-Jurisdictional Natural Hazard Mitigation Plan

OBJECTIVE: Board Action

Issue

Management requests Board adoption of the EWEB annex to the Lane County Multi-Jurisdictional Natural Hazard Mitigation Plan (NHMP).

Background

The Federal Emergency Management Agency (FEMA) requires states, tribal and local governments to develop and adopt Natural Hazard Mitigation Plans as a condition to receive certain types of non-emergency disaster assistance, including grant funding for mitigation projects. EWEB has been a participant in the Eugene-Springfield NHMP since 2014 with successful renewal every 5 years since. The Board adopted the last EWEB NHMP Annex plan January of 2020.

Mid-year 2024, the City of Eugene, City of Springfield, and annex holders (including EWEB) agreed to transition to the County NHMP to streamline regional planning efforts and administrative plan coordination.

EWEB Board Members reviewed a draft of the updated EWEB Annex plan at their August 6, 2024, meeting as a precursor to submitting the Annex to FEMA for its review process. Staff finalized the required public engagement component of the EWEB annex plan later in September, documenting the results in the final draft Annex. Public engagement was two-fold:

- 1) EWEB multi-channel outreach to customers and the public about the annex plan, hazard quantification results and mitigation activities planned, with a request for feedback on risk prioritization and other plan components.
- 2) Participation in the public engagement process hosted by the City of Eugene on behalf of the annex holders and public survey process.

The finalized public engagement summary is included as attachment to the EWEB annex plan.

Discussion

EWEB submitted the draft annex to the Oregon Department of Emergency Management (OEM) last September for review and to forward along to FEMA. In early February, OEM shared initial review comments from FEMA with EWEB, which were generally related to ensuring that climate change impacts were duly considered in the risk assessment process. Other changes to the annex from the initial FEMA review included:

- Inclusion of Tsunami hazard in the risk matrix even though the risk score = 0
- Inclusion of impact area within the EWEB service area for each hazard
- Inclusion of reference to future population impact and land use/development in EWEB service area

After making the requested adjustments, the annex plan was resubmitted for approval or further guidance. EWEB has since been notified that FEMA is experiencing staffing changes and undergoing policy and programmatic reprioritization. It is not anticipated that FEMA will review the updated annex and/or give final approval for several more months. However, as the EWEB annex plan expires in May 2025, Board adoption is requested for plan continuity and to avoid potential issues associated with a lapsed plan impacting grant eligibility. If FEMA does require additional changes to the EWEB Annex, the Board may be requested to approve an amended plan in the future.

Recommendation/Board Action

Approve the 2025 EWEB Annex to the Lane County Multi-Jurisdictional Natural Hazard Mitigation Plan and direct Management to submit a record of Board action to FEMA (Resolution # 2503).

Attachments:

1. EWEB NHMP Annex
2. EWEB NHMP Annex, Attachment 1
3. Board Resolution No. 2503 – EWEB NHMP Annex

Section 13: Eugene Water & Electric Board

Annex to the Lane County Multi-Jurisdictional Natural Hazard Mitigation Plan



2024 – 2028 Planning Cycle

*Adopted by EWEB Board of Commissioners
05/06/25, Resolution #2503*



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1. Public Engagement Summary

Acronyms (A)

	Description		Description
BPA	Bonneville Power Administration	HRA	Hazard Risk Assessment
COE	City of Eugene (the City)	LiDAR	Light Detection and Ranging
COOP	Continuity of Operations Plan	MAI	Mitigation Action Item(s)
COS	City of Springfield	MJNHMP	Multi-Jurisdictional Natural Hazard Mitigation Plan
CSZ	Cascadia Subduction Zone	NHMP	Natural Hazard Mitigation Plan
CWPP	Community Wildfire Protection Plan	NOAA	National Oceanic Atmospheric Administration
DMA	Disaster Mitigation Act	OEM	Oregon Dept. of Emergency Mgmt.
DOGAMI	OR Department of Geology Minerals and Industries	ROC	Roosevelt Operations Center
EOC	Emergency Operations Center	RWD	Rainbow Water District
EPA	Environmental Protection Agency	SPIRE	State Preparedness and Incident Response Equipment Grant - Oregon
FEMA	Federal Emergency Mgmt. Agency	SUB	Springfield Utility Board
GIS	Geographic Information Systems	USDA	US Department of Agriculture
HMGP	FEMA Hazard Mitigation Grant Program	USGS	US Geological Survey
HQ	Headquarters	WF	Weight Factor
HRA	Hazard Risk Assessment	WPRD	Willamalane Park and Recreation District
LiDAR	Light Detection and Ranging	WUI	Wildland Urban Interface

Section 13.1: Jurisdictional Profile and Background

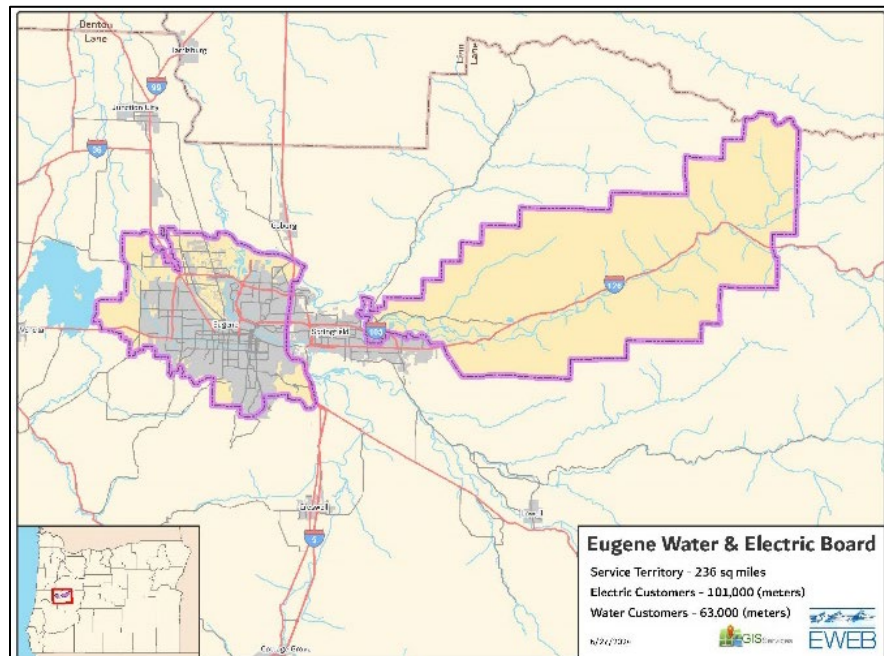
13.1.1 Profile

The Eugene Water & Electric Board (EWEB) is the largest publicly owned electric and water utility in Oregon. The City of Eugene (the City) commenced utility operations in 1908 with the purchase of a privately-owned water system. In 1911, upon completion of the City's first municipal hydroelectric power plant, the City organized the Eugene Water Board to operate the City's electric and water utilities. The name of the Eugene Water Board was changed to the Eugene Water & Electric Board in 1949.

EWEB is chartered by the City and supplies electric and water service within the city limits of Eugene and to certain areas outside the city limits. Employing over 550 people, EWEB operates as a primary government, and is not considered a component unit of the City. EWEB is governed by a five-member Board of Commissioners who are elected by voters residing in the City. The Board is responsible for the adoption of this plan and funding for priority activities. The General Manager will oversee plan implementation.

- **Population served:** 190,000 (2022 estimate¹)
- **Land area served:** 236 square miles
- **Land area owned:** 44 square miles

EWEB has participated in the Eugene-Springfield MJNHMP process since 2009. In 2017, with the guidance from the Oregon Department of Emergency Management (OEM), the Cities reorganized the structure of the NHMP to better align with “special district” requirements set forth by the Robert T. Stafford Act, as amended by the Disaster Mitigation Act (DMA).



As EWEB had invested significant effort in the development of this plan, its Board of Commissioners formally adopted the MJNHMP Annex Plan to ensure their eligibility to participate in the programs outlined within the Stafford Act. The plan was renamed to “City of Eugene and City of Springfield Multi-Jurisdictional Natural Hazards Mitigation Plan” (COE/COS MJNHMP). In May of 2020 the next plan was successfully renewed with approval by FEMA.

¹ 178,259 City residents per 2022 estimate from Portland State University and over 11,000 Lane County residents that reside within EWEB electric service territory.

In 2023, as the COE/COS plan holders were meeting to update their plan, Lane County completed their successful renewal process, which included an additional three utility providers as annex plan holders. In early 2024 the COE/COS MJNHMP Committee selected to adopt the state hazard risk assessment methodology utilized by Lane County. This transition provided for an aligned risk assessment of the area hazards specifically for the COE/COS annex holders as many of them had overlapping service areas outside of the city's jurisdiction. It also provided for a continuity of risk assessment across disciplines such as fire and floodplain management and most Lane County jurisdictions. The response to both the 2020 global pandemic and the 2020 catastrophic Oregon wildfires identified the need for more collaborative and integrated processes for preparedness, mitigation, response and recovery among regional jurisdictions.

As the 2025 COE/COS MJNHMP renewal process continued, the City of Eugene expressed an interest exploring integration with the County MJNHMP, given the potential benefits to plan holders including:

- Continuity of risk assessment process among most jurisdictions that are already incorporated within the county MJNHMP – shared resources for research, analysis of risk and impacts to area populations and infrastructure.
- Consolidated planning efforts in response to those identified risks specific to mitigation strategies and potential regional grant project alignments and applications.
- Expanded ability to conduct capabilities assessment to a larger service area – more in line with an actual response mutual aid resource request footprint.
- Consolidated public engagement, i.e., reduction of duplicate efforts engaging with the public on same subject matters but initiated in different cycles.
- Provide for a more regional approach to partnerships for annex holders; planning, on-going natural hazard committee meetings would incorporate a larger partnership vs. limited to a smaller geographical area.

In consultation with Lane County Emergency Management, Oregon Department of Emergency Management (OEM) and FEMA it was affirmed that such transition could take place under the County's current plan if the new annex plans were submitted prior to the post one year approval date, 10/13/2024. The City of Eugene leadership approved this transition and is supporting the other annex holders in their process to transition to the County plan. Accordingly, EWEB made a formal request to County to join their plan on May 30, 2024.

The current COE/COS plan will be retired. Another sibling plan that is currently being updated, COS/COE Community Wildfire Protection Plan (CWPP), is also transitioning under the Counties CWPP. A separate public engagement campaign will be held July – August of 2024 as the transitioning annex holders were not able to fully participate in the Counties public engagement campaign. The annex holder's engagement campaign will include notification to the public of the transition, update on the hazard risk assessment, mitigation strategies, and solicit public feedback as outlined in the FEMA required elements.

Section 13.1.2 Electric System

The Electric System supplies service to 101,000 residential, commercial, and industrial customers within the City of Eugene and areas along the McKenzie River between the cities of Walterville and Vida, where two of EWEB's hydro-power plants are located.

Power delivered to customers is supplied by the Bonneville Power Administration (BPA) via EWEB-owned generation resources, other contracted resources, and purchases from the wholesale energy markets. EWEB's power supply sources are primarily hydropower, but also include wind, biomass, and solar. The electric utility's 2024 budget is nearly \$400M, with over \$85M for capital improvements, including debt service, and the remainder allocated towards operations and maintenance costs. Power purchases are the largest operational cost-driver for the electric utility.

- **Transmission and distribution lines:** 1,600 miles
- **Substations:** 38
- **Utility-owned hydroelectric facilities:** 4

Electric System operating assets historical costs² are listed below (Table A-1). Note that capital improvements at the Carmen Smith Hydroelectric Project per current licensing requirements are projected to cost \$174 million. The insured value of all hydro-electric production facilities, which approximates replacement value, is around \$1 billion as of February 2023. The estimated values of major electric assets are listed below.

Table 13.6.1: Estimated Value of Electric Utility Assets

Electric Asset Type	Historical Cost (As of Dec 2022)	Insured Values
Land	\$9,820,003	
International Paper Biomass (Turbine #4)	\$10,622,218	\$34,379,630
Hydro Production ³	\$137,573,596	
Transmission	\$89,357,069	
Distribution	\$366,596,505	
General Plant ⁴	\$181,316,922	
Telecommunications	\$23,724,726	\$818,296
Completed Construction, not yet classified	\$4,613,099	
Construction Work in Progress	\$57,175,038	
TOTAL	\$880,799,176	

As of 2018, power production ceased at the Leaburg hydro-electric facility due to safety concerns associated with the earthen canal that transports water to the powerhouse. In late 2022, the EWEB Board voted to move towards decommissioning the plant and modify the canal for stormwater conveyance only. The utility is now designing near-term risk reduction measures to stabilize the Leaburg canal while decommissioning plans are developed.

² Cost when the asset was first placed in service and capital improvement costs to that asset over time.

³ Includes the Stone Creek Hydroelectric project located on Clackamas River, OR.

⁴ Includes electric utility portion of fleet and administration/operational buildings.

Current and Anticipated Service Trends

Eugene area population is estimated to grow by an average annual rate of 0.9%, which is a half percentage point reduction from the prior MJNHMP. Modest increased demand for energy due to population growth has been historically offset through energy conservation. Transportation electrification, particularly for light-duty vehicles, is expected to further increase demand for electricity. However, unless a new, large industrial facility locates in our service territory, near term electric consumption is anticipated to remain manageable using existing facilities and energy resources. This is due to higher energy efficient buildings and equipment, use of natural gas for commercial and industrial uses, and the on-going success of utility energy conservation programs. Peak power usage continues to occur in winter months, although summer demand is increasing as air conditioning usage grows.

With more uncertainty around future electricity consumption, particularly during times of extreme weather events, EWEB is embarking on an iterative, biennial process to update power planning assumptions and capital needs in anticipation of a more dynamic energy future. The utility has land reserved for two additional substations and is implementing plans to rebuild existing key substations for additional capacity and resiliency.

Section 13.1.3 Water System

EWEB provides treated drinking water to 63,000 residential, commercial, industrial, and public sector customers within its Eugene service territory. EWEB also supplies wholesale water to the River Road and Santa Clara water districts in unincorporated North Eugene and has wholesale water contracts with the City of Veneta and the Willamette Water Company. The utility also has interconnections with the Springfield Utility Board and Rainbow Water District municipal water systems.

The water utility maintains three water rights for drinking water at a single point of delivery on the McKenzie River. EWEB efforts to diversify water supply sources include a groundwater permit issued in 2008, and a surface water registration and permit issued on the Willamette River. Water permits will not be certificated until a sufficient volume of water from these sources is distributed for municipal use.

Raw water is collected via two river intake structures located at Hayden Bridge in Springfield and delivered to a nearby treatment plant. The water treatment plant pre-treats, filters, and treats the raw water for consumption. Two large transmission lines along a seven-mile corridor bring treated water to the Eugene city limits. From there, transmission and distribution pipelines deliver water to customers. Hayden Bridge produces about 7.5 billion gallons of drinking water each year.

Pressure to deliver the water to the baseline reservoir system serving about 85% of EWEB customers is controlled largely at the filtration plant. A system of pumps and smaller storage tanks serve the remaining customers living at upper elevations. The water utility's 2024 operating budget is \$71 million. The budget for capital improvements is \$29 million, including debt service, with the remainder allocated towards operations and maintenance costs.

- **Reservoirs:** 23 (89 M gallons capacity)
- **Pump stations:** 27
- **Water distribution system:** 800 miles

The estimated value of major water utility assets, in historical cost and insured values (when value approximates replacement costs) is listed in Table 13-2.

Table 13.6.2: Estimated Value of Water Utility Assets

Water Utility Asset Type	Historical Cost (as of Dec 2022)	Insured Values
Land	\$1,294,957	
Hayden Bridge Treatment Plant	\$47,446,344	\$128,603,301
Source of Supply	\$25,995,834	
Water Transmission & Distribution	\$210,870,441	
Reservoirs/Pumping	\$40,908,154	\$154,051,393
General Plant	\$18,366,283	
Completed Construction, not yet classified	\$7,102,151	
Construction Work in Progress	\$26,409,755	
TOTAL	\$378,393,919	

Current and Anticipated Service Trends

Water consumption remains nearly flat despite modest population growth as more efficient plumbing codes and changing irrigation practices shift overall consumption levels downward over time. Annual usage is still highly weather dependent. Hotter, drier summers often create high daily demands for water, though peak consumption remains well within existing treatment and transmission capabilities. Additional wholesale water contracts to nearby small cities are technically feasible but not anticipated in the near future.

Section 13.2 Natural Hazard Mitigation Meetings and Work Sessions

EWEB was an active participant in the COE/COS MJNHMP steering committee, which met on a quarterly basis and more frequently for plan updates. EWEB also participated in planning sessions during the development of the 2023 Lane County MJNHMP. In addition, specific meetings were organized with EWEB subject matter experts to prioritize future mitigation activities, including members of our finance, facilities, and communications teams. Two work sessions with EWEB Operations Managers were held to review the hazard risk ranking analysis and finalize mitigation actions for the new planning cycle.

Table 13.6.3: EWEB (Internal) NHMP Operations Manager Work Session Participants

Name/Title	Topic	Meeting Dates
Karen Kelley, Chief Operations Officer	Discuss New Mitigation Action Items Review Hazard Risk Assessment	12/7/23 6/6/24
Lisa Krentz, Generation Manager	Discuss New Mitigation Action Items	12/7/23
Tyler Nice, Electric Operations Manager	Discuss New Mitigation Action Items Review Hazard Risk Assessment	12/7/23 6/6/24
Mike Masters, Water Operations Manager	Discuss Mitigation Action Items	12/7/23
Scott Milovich, Shared Services Manager	Review Hazard Risk Assessment	6/6/24

Table 13.6.4: EWEB City/County MJNHMP Committee and Workgroup Participation

2024 NHMP Annex Planning Committee and Workgroup EWEB Participation (City/County MJNHMP Groups)				
COE/COS MJNHMP Committee	County MJNHMP Committee	MAI & Annex Plan Workgroup	Hazard Risk Assessment Workgroup	Public Engagement Workgroup
01/23/23	10/17/22	11/21/23	03/21/24	03/19/24
04/24/23	02/02/23	01/29/24	04/16/24	04/12/24
08/28/23		03/06/24	04/25/24	04/22/24
10/23/23		06/05/24*		09/04/24-
02/05/24		08/06/24 Draft Review		Presentation
04/29/24		by EWEB Board of		
07/22/24		Commissioners		

- 1) City of Eugene/Springfield (COE/COS) MJNHMP Committee – met quarterly, concluded 07/22/24
- 2) County of Lane MJNHMP Committee – meets semi-annually
- 3) COE/COS – Annex Specific Mitigation Action Item Review and Annex Plan Discussions
 - *Transition Discussion – City to County MJNHMP
- 4) COE/COS – Hazard Risk Assessment (HRA) Workgroup
 - Purpose – evaluate the 2020 assessment, evaluate transition to the state HRA methodology, then work towards finalizing assessment. June of 2024 City of Eugene opted to disband their individual plan and move towards the County MJNHMP. EWEB utilized the County HRA to finalize their internal agency HRA.
- 5) Public Engagement Campaign Workgroup
 - Participated in the COE/COS public engagement campaign development process and then the implementation of the campaign July – September 2024.

13.3 Hazard Quantification

Section 13.3.1 Hazard Event History and Risk Ranking

The table below lists past occurrences of natural hazards affecting EWEB over the past 20 years and where data is available, the estimated damage to EWEB assets for each incident.

Table 13.6.5: Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Incident Timeframe	Preliminary Damage Assessment (EWEB)	Estimated Damage (Lane County)
Severe Winter Storm	DR-4768-OR	January 12 – 27, 2024	\$8M	\$35M
Lookout Mtn Wildfire	N/A	August 5 – October 13, 2023	TBD	
Holiday Farm Wildfire	DR-4562-OR	September 7 – November 3, 2020	\$7.5M	\$62M
Severe Winter Storm	DR-4432-OR	February 25 – March 4, 2019	\$4.3M	\$14.2M
Windstorm	N/A	April 7, 2017	Data unavailable	
Severe Winter Storm/Freezing Rain	DR-4296-OR	December 14 -17, 2016	\$4.2 M	\$8.9M
Severe Winter Storm/Windstorm	DR-4258-OR	December 6 – 23, 2015	\$195,000	\$1.3M
Severe Winter Storm	DR-4169-OR	February 6 – 14, 2014	\$1.9 M	\$6.7M
Severe Winter Storm	DR-4055-OR	January 17-21, 2012	\$35,000	\$1.4M
Severe Winter Storm	N/A	March 21-26, 2012	Data unavailable	
Windstorm	N/A	March 13 - 16, 2011	Data unavailable	
Severe Winter Storm	N/A	December 27 – 29, 2008	Data unavailable	
Windstorm	N/A	February 2-4, 2006	Data unavailable	
Windstorm	DR-1405-OR	February 7-8, 2002	\$1.5 M	\$3.9M

Source EWEB and Lane County.

Table 13.6.6 presents the ranking of hazards of concern to EWEB using the quantification method developed by Oregon Department of Emergency Management. This methodology characterizes risk based on history of events, probability of and vulnerability to future events, and the maximum threat posed in a worst-case scenario. Weighting factors (WF) are applied to produce a total risk score to rank the relative risk of each hazard.

All natural hazards represented in the Lane County MJNHMP are represented in the hazard quantification assessment summary below. Directly following is the narrative review of each individual hazard that is applicable to the EWEB service area.

Table 13.6.6: Hazard Quantification

Hazard Risk Assessment Summary: EWEB Assessment Conducted: March – July 2024 Assessment Tool: State of Oregon – Hazard Analysis Methodology Assessment Reviewed by: <ul style="list-style-type: none"> - EWEB Operations Team Representatives 06/06/24 - Lane County Emergency Management – 08/13/24 - Public Feedback Via Digital Survey – July/August 2024 – see attachment 13.7.1 for summary 	Scoring	
	160 - 240	High
	80 – 160	Moderate
	0 - 80	Low

Hazard Type / Weight Factor (WF)	History WF x 2	Probability WF x 7	Vulnerability WF x 5	Max. Threat WF x 10	Weighted Score	Weighted Score Rank	2024 EWEB Rating	2023 County Rating
Winter Storm	18	63	40	80	201	1	High	High
Wildfire	16	56	35	80	195	2	High	High
Earthquake	6	28	50	100	184	3	High	High
Extreme Weather	16	63	30	50	159	4	Moderate	High
Windstorm	12	35	40	70	157	5	Moderate	High
Flood	12	49	20	70	151	6	Moderate	High
Landslide	2	28	20	50	100	7	Moderate	Moderate
Drought	16	49	10	20	95	8	Moderate	Moderate
Volcano	4	14	25	40	83	9	Low	Low
Tsunami*	0	0	0	0	0	N/A	N/A	High

Source EWEB.

*Tsunami hazard impacts the coastal areas along Pacific Ocean as identified in the Lane County MJNHMP base plan, EWEB service area does not extend to the coastal region.

Section 13.3.2: Individual Hazard Discussions

As the table above indicates, EWEB's risk rankings are very similar to the Lane County Planning area. Some variations exist due to differences in vulnerability and maximum threat to our assets and customers to certain hazards. Like Lane County, winter storms, wildfire and earthquakes ranked highest. However, flooding and extreme heat ranked lower in EWEB's analysis than for Lane County. Tsunami is not represented below in the individual hazard information as it does not pose a risk to our EWEB service area.

The following provides a narrative review of each of the applicable natural hazards present in our EWEB service area. Hazards are listed in alphabetical order.

EWEB Service Area = Incorporated City of Eugene and portions of unincorporated area of Lane County (McKenzie River along Hwy 126). City of Eugene is within the boundaries of Lane County.

Natural Hazard: Drought

Impact Area: Entire EWEB Service Area

Hazard Risk Assessment Rating: #8 – Score 95 out of possible 240, Moderate Rating

Future Impacts:

- **Population Patterns:** Continued population growth in the Eugene/Lane County area is anticipated.
- **Land Use/Development:** New development and growing population will increase water and electricity demand.

According to the last 20 years of data from the U.S. Drought Monitor, severe and extreme drought conditions are occurring with increasing frequency in Lane County. Lane County declared State of Drought Emergencies in both 2015 and 2021, and moderate to extreme drought occurred in 2019 and 2022 as well. Climate change studies indicate that the Western Cascades will experience less overall precipitation, reduced snowpack and more frequent heatwaves, all increasing the probability of drought.

Drought has no direct impact on the electric utility assets and service. EWEB's sole source of water, the McKenzie River, has some natural resiliency to drought as mountain snowmelt is captured in underground volcanic rock formations before bubbling up through natural springs years later. Still, low stream flows cause other environmental impacts and are conducive to toxic algal blooms. Enhanced monitoring and treatment capabilities at the Hayden Bridge Filtration Plant mute stream flow impacts to drinking water delivery. EWEB has active water conservation programs and issues public advisories to urge responsible water use during drought conditions. Curtailment plans are in place if needed for an extreme situation.

Drought has more of a cascading impact to the electric utility. Prolonged and reoccurring droughts in temperate forests are having drastic effects on tree mortality rates. Diseased and dying trees, coupled with dry fuels and soils, elevate the potential for large wildfires. Trees weakened by drought are more likely to have branches break off or the entire tree fall during

wind and winter storms. When this occurs in proximity to electric lines, outages are likely, and utility equipment can be damaged.

Natural Hazard: Earthquake

Impact Area: Entire EWEB Service Area

Hazard Risk Assessment Rating: #3 – Score 184 out of possible 240, High Rating]⁵

Future Impacts:

- **Population Patterns:** Continued population growth in the Eugene/Lane County area is anticipated.
- **Land Use/Development:** Continued re development, seismic hardening of infrastructure continues to improve the region’s ability to withstand an on-shore or off-shore subduction zone earthquake.

Fault lines exist across EWEB service territory that can produce crustal earthquakes, although these are fairly uncommon. The most recent earthquake was in 2015, a 4.2 magnitude earthquake centered in Waltherville. None of EWEB’s electric or hydroelectric facilities were damaged in this event. Western Oregon is also susceptible to a magnitude 9.0 Cascadia Subduction Zone (CSZ) earthquake which is expected to produce strong to severe ground shaking in and around Eugene at a magnitude 7.0 with lesser effects to our upriver territory. Extensive damage to electric, water and communications infrastructure is expected, particularly in areas where soil liquefaction is likely. Studies indicate that areas between east Springfield and Waltherville have high susceptibility to liquefaction.

[The Oregon Resilience Plan](#)⁶, in 2013, estimated there is a 37 to 43% for a CSZ earthquake in the next 50 years. While EWEB is currently working to fortify critical infrastructure against such an event, damage to poles, transformers, water distribution mains and customer service lines would leave much of our community without water or power for weeks or longer. Given the size and magnitude of such an event, Federal resources would be needed for restoration.

⁶ [Oregon Resilience Plan, State of Oregon](#)

Natural Hazard: Extreme Weather

Impact Area: Entire EWEB Service Area**Hazard Risk Assessment Rating:** #4 – Score 159 out of possible 240, Moderate Rating**Future Impacts:**

- **Population Patterns:** Continued population growth in the Eugene/Lane County area is anticipated.
- **Land Use/Development:** A greater reliance on temperature-controlled living and working spaces may help compensate for extreme heat events, but will also add demands on the electric grid.

Heat waves with several days of peak temperatures over 100 degrees are not uncommon in the EWEB service territory. In the past, these events were tempered by nighttime cooling that protects electric infrastructure from over-heating and allows buildings without air conditioning to cool down. More recent extreme heat events such as the June 2021 heat dome, where Eugene experienced a high of 111 degrees, put greater strain on utility infrastructure and heighten public health risks. Climate change induced trends indicate greater frequency of extreme heat events.

Utility impacts from extreme heat include underground cable and transformer failures and associated power outages. Water consumption can double or triple typical daily usage as customers increase irrigation. If the heat event is regional in nature, as the 2021 heat dome, power prices spike in response to cooling demand. EWEB's electric system redundancy and ample water production capacity mutes the severity of impacts. However, in a worst-case scenario it is possible that the utility could be required to shed electric load (rolling brown outs) due to power supply constraints, which could have much wider financial and society impacts. Until regional electric capacity issues are addressed, this remains a potential risk.

Natural Hazard: Flooding

Impact Area: McKenzie River Flood Plain Area**Hazard Risk Assessment Rating:** #6 – Score 151 out of possible 240, Moderate Rating**Future Impacts:**

- **Population Patterns:** Continued population growth in the Eugene/Lane County area is anticipated.
- **Land Use/Development:** Service area includes properties along the McKenzie River for water treatment/generation in potentially vulnerable locations.

EWEB's territory includes the Willamette and McKenzie River floodplains, both of which are prone to flooding events. Reservoirs and dams on these rivers effectively control flooding under most, but not all, circumstances where EWEB equipment would be affected. Significant and prolonged flooding has the potential to damage substation equipment, and saturated soils can destabilize power poles and lead to water main breaks. However, EWEB has experienced minimal direct damage to its assets from prior floods, including during the 1996 '100-year' flood event. In the future, higher instream flows due to atmospheric river events and/or heavy rain on burn-scarred landscapes in the watershed may increase the frequency and severity of flooding events.

Since the last MJNHMP, EWEB has taken several notable steps to mitigate flood risk. When the raw water intake structures were rebuilt at Hayden Bridge, electrical equipment was moved above the 100-year flood level. Improved monitoring and treatment capabilities at the filtration plant are also in place to manage turbidity issues impacting water quality. Lastly, EWEB is an active partner in floodplain restoration projects in the middle McKenzie watershed, such as Finn Rock and Quartz Creek.

Natural Hazard: Landslide

Impact Area: McKenzie River Watershed Area and South Eugene Hills

Hazard Risk Assessment Rating: #7 – Score 100 out of possible 240, Moderate Rating

Future Impacts:

- **Population Patterns:** Continued population growth in the Eugene/Lane County area is anticipated.
- **Land Use/Development:** Continued development in landslide hazard risk areas increase risk of infrastructure impacts when events occur.

Portions of EWEB's service territory with steep slopes are susceptible to landslide activity. This is exacerbated in areas impacted by the Holiday Farm (2020) and other recent wildfires. There is a record of active landslides in these areas, but little recorded damage to EWEB assets. Severe weather such as atmospheric rivers and/or an earthquake could trigger more extensive landslide activity impacting EWEB assets such as power poles and water mains. Landslides also carry water quality issues if debris flows reach the river, as well as environmental contamination risks. However, landslide activity in and of itself is not expected to cause widespread damage to utility infrastructure or prolonged service disruptions to residents.

Eugene Area Landslide Hazard and Risk Study Eugene-Springfield and Lane County, Oregon by Oregon Department of Geology and Mineral Industries – [2018 Report](#).

Natural Hazard: Volcano

Impact Area: EWEB Entire Service Area for Ash Fallout, Direct Volcano Impact – McKenzie River – Carmen Smith and Leaburg-Walterville Hydro-electric project areas

Hazard Risk Assessment Rating: #9 – Score 83 out of possible 240, Low Rating

Future Impacts:

- **Population Patterns:** Continued population growth in the Eugene/Lane County area is anticipated.
- **Land Use/Development:** No changes expected due to development within EWEB's service area.

According to the Oregon Natural Hazard Mitigation Plan, the Three Sisters region has a clear history of volcanic eruptions, but none documented in the last 15,000 years. Monitoring at South Sister, which is about 20 miles away from the Carmen Smith Hydro-electric plant, indicates some subsurface magma activity. Ashfall from an eruption at South Sister or any nearby volcano would impact Carmen-Smith operations and potentially impact water quality 60 or more miles downstream at the Hayden Bridge Treatment plant. EWEB's ability to access other electric generating resources and the future water treatment facility on the Willamette River mitigate risk to electric and water service.

Natural Hazard: Wildfire

Impact Area: Eugene WUI and Upriver Service Territory Area

Hazard Risk Assessment Rating: #2 – Score 195 out of possible 240, High Rating

Future Impacts:

- **Population Patterns:** Continued population growth in the Eugene/Lane County area is anticipated.
- **Land Use/Development:** Continued public and private use of fire-resistant building materials and defensible space can improve resilience in areas in or adjacent to forests and heavy vegetation.

Lane County's 2020 [Community Wildfire Protection Plan⁶](#) (CWPP) divides Lane County into three distinct ecoregions and describes the overall wildfire risk for the Willamette Valley Ecoregion, where most EWEB assets and customers are located, as generally low to moderate risk. Areas of higher risk for this ecoregion include the south hills of Eugene, where there is dense residential development close to and intermixed with forestlands.

The Cascades Ecoregion, which includes the McKenzie Valley, was classified as moderate to high risk due to the predominance of forested lands with mountainous topography, frequent lightning events and limited access for firefighting resources. Based on historical occurrences, there is a high probability of future wildfire occurrences in the Cascades region⁷.

⁷ Lane County Multi-Jurisdictional Natural Hazard Mitigation Plan (2023).

Table 13.6.7: Recent History of Wildfire Activity Near EWEB Infrastructure

Event Name	Year	Location	Acres Burned
Lookout Fire	2023	4 miles NE McKenzie Bridge	25,754
Moon Mtn Fire	2023	Southeast Eugene	34
Knoll Fire	2021	7 miles NE McKenzie Bridge	544
Holiday Farm Fire	2020	3 miles W of McKenzie Bridge	173,393
Terwilliger Fire	2018	3 miles SE of Blue River	11,555
Rebel Fire	2017	13 miles S of McKenzie Bridge	8,709
Horse Creek Complex	2017	7 miles S of Belknap Springs	33,780

Wildfire smoke incursions degrade air quality in the valley on an annual basis, creating unhealthy air for days to weeks at a time. While smoke does not directly impact EWEB infrastructure, EWEB will make operational adjustments to protect workers from prolonged exposure to poor air quality.

While most of EWEB's infrastructure is in urban areas with relatively low risk for wildfire, long portions of the electric system run through heavily forested terrain, and generation facilities are in areas considered at high risk for wildfire. For example, the Carmen Smith hydro-electric plant was on Level III evacuation notice and shut down for weeks during the 2023 Lookout Fire. In addition to lost generation, multiple transmission structures were damaged during the fire and federally required fish passage activities were curtailed.

EWEB serves several thousand customers who live in the wildland-urban interface (WUI), and multiple upper-level reservoirs and pump stations are in the WUI. In 2022, EWEB adopted its first risk-based Wildfire Mitigation Plan, which includes a commitment to annual updates and metrics to track progress. However, climate change impacts such as hotter, dry summers coupled with increased tree mortality from prolonged drought exacerbates the probability of a wildfire in the WUI. Despite greater focus on wildfire mitigation, proximity to and increasing frequency of wildfire activity threatens both public safety and critical infrastructure.

Natural Hazard: Windstorm

Impact Area: Entire EWEB Service Area**Hazard Risk Assessment Rating:** #5 – Score 150 out of possible 240, Moderate Rating**Future Impacts:**

- **Population Patterns:** Continued population growth in the Eugene/Lane County area is anticipated.
- **Land Use/Development:** New development and growing population will increase electricity demand and vulnerability to disruptions.

Windstorms producing sustained gusts of over 40 mph are typically part of a winter or heavy rainstorm event. These events occur every few years and cause localized power outages and infrastructure damage. Extreme wind events occur with less frequency but can result in extensive damage to property and electric infrastructure. If the windstorm is accompanied by wind or snow, more extensive damage occurs due to tree-related impacts to powerlines.

Peak gusts reached 70 mph during the February 2002 storm and the December 2015 storm caused over \$1.3M in damage countywide (both events were federally declared disasters). EWEB infrastructure is also susceptible to straight-line wind events, which can produce strong, dry east winds. Straight-line winds in late summer can fuel the rapid growth of a wildfire, as was the case in September 2020. Enhanced vegetation management and grid hardening can mitigate damage to overhead electric facilities from typical but not necessarily extreme wind events.

Natural Hazard: Winter Storm

Impact Area: Entire EWEB Service Area**Hazard Risk Assessment Rating:** #1 – Score 200 out of possible 240, High Rating**Future Impacts:**


- **Population Patterns:** Continued population growth in the Eugene/Lane County area is anticipated.
- **Land Use/Development:** New development and growing population will increase electricity demand and vulnerability to disruptions.


As 13.6.6 indicates, winter storms occur with relative frequency. Damage typically results from storms that deliver a combination of heavy, wet snow, ice and/or wind. While these types of events may not be severe enough to trigger a disaster declaration, some still require an ICS response for EWEB to effectively manage the repair and restoration process. Considering both disaster-declarations and ICS responses together, a severe winter storm can be expected about every other year. Damage often includes downed poles, wires, transformers, broken cross-arms and tree-related damage. Depending on the severity of the event, anywhere from 5000 – 20,000 homes and businesses can be impacted with full restoration taking upwards of two weeks.


January 2024 ice storm caused 38,000 outages, including loss of power to critical infrastructure such as communication towers and the water treatment plant. Widespread winter storms constrain mutual aid support and availability of contract crews, further delaying service restoration. The frequency of winter storm events and the high potential for costly damage remains a threat.


13.4 Mitigation Strategies


The following section describes the current Mitigation Action Initiatives (MAIs) that make up EWEB's portion of the Lane County MJNHMP. EWEB is the lead agency and funding source for these initiatives unless otherwise noted.

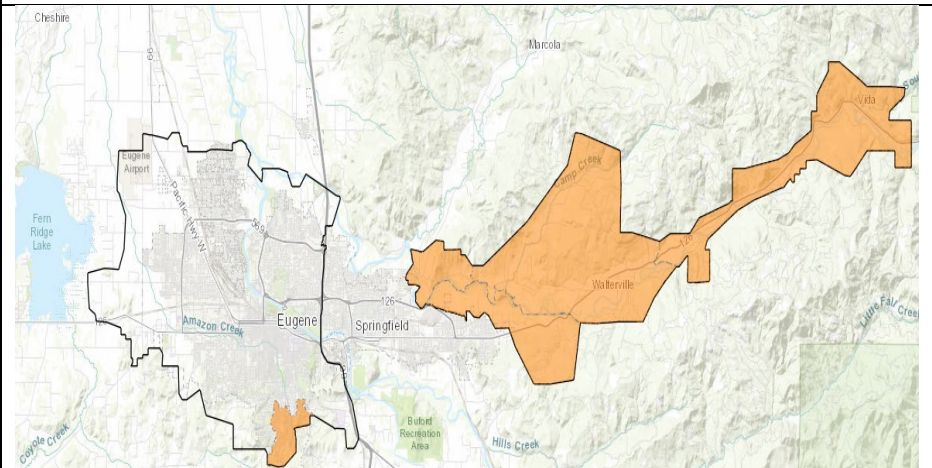
Mitigation Action Item A	Second Source Treatment Plant and Transmission Project
Location	Glenwood, Springfield, Southeast Eugene
Coordinating Agencies	City of Eugene, Springfield and Lane County
Implementation Timeframe	2025-2030
Estimated Cost	\$98M
Potential Funding Sources	Operational; EPA Water Infrastructure Finance and Innovation Act Loan, State or Federal legislative appropriation.
Hazards Mitigated	All Hazards
Comments	Construct a new water intake structure and filtration plant on the Willamette River, with necessary water transmission lines, to provide a secondary source of drinking water supply, treatment and delivery. The facilities will be built to modern seismic standards and sized to meet Eugene's minimum daily water demand. This project is carrying over from the previous MJNHMPs, with property acquisition, water rights and other preliminary planning and site work accomplished. Future work includes final design, permitting, facility and transmission main construction and commissioning.
Site Photos	


Mitigation Action Item B	Base Level Reservoir Rebuilds – College Hill
Location	25 th – 27 th Lincoln & Lawrence Streets
Coordinating Agencies	City of Eugene, Oregon Health Authority, State of Oregon Historic Preservation Office
Implementation Timeframe	2024-2027
Estimated Cost	\$31M
Potential Funding Sources	Operational funds
Hazards Mitigated	Earthquake, Drought
Comments	<p>EWEB has three base level reservoirs that provide drinking water to all Eugene, none of which meet modern seismic standards. The utility will decommission the 80-year-old College Hill reservoir and construct two seismically-sound tanks on the same site and associated transmission piping. The existing reservoir has leaky roof joints that pose water quality concerns, and the structure cannot be cost-effectively retrofit. The completion of new water storage at the East 40th site will allow EWEB to undertake this project without compromising water pressure or community drinking water supply needs. Once the new tanks at College Hill are complete, the Santa Clara Reservoir, classified as a high hazard dam, can be taken off-line.</p>
Site Photos	


Mitigation Action Item C	Water Transmission Main Upgrades and Feasibility Studies
Location	City of Eugene Base Level System
Coordinating Agencies	City of Eugene
Implementation Timeframe	2024-2029
Estimated Cost	\$18.5M
Potential Funding Sources	Operational, EMA Hazard Mitigation Grants
Hazards Mitigated	Earthquake
Comments	Upgrading aging transmission pipes will improve resiliency to major disruptions, increase redundancy and provide operational flexibility for efficient system maintenance. Beyond the upgrades associated with baseline reservoir rebuilds, transmission main replacements are planned for the 42" riverfront connector and along the corridor from the Hayden Bridge Treatment Plant into Springfield. EWEB was also awarded FEMA AA HMPG funds to conduct feasibility studies to select a preferred solution to rebuild major river-crossing water transmission pipes at the Knickerbocker Bridge and Day Island Road. HMPG project funds may be sought to support rebuilding these river crossings for greater seismic resilience and redundancy once the feasibility studies are concluded.
Site Photos	

Mitigation Action Item D	Upper-Level Reservoir and Pump Station Upgrades
Location	Southeast Eugene
Coordinating Agencies	N/A
Implementation Timeframe	2025-2029
Estimated Cost	\$10M
Potential Funding Sources	Operational
Hazards Mitigated	Earthquake, Wildfire
Comments	<p>EWEB plans seismic upgrades and retrofits to bring pump stations and reservoirs serving customers at higher elevations to modern standards. One pump station rebuild is planned each year, with the City View 1150 and Willamette 975 facilities prioritized for work in the next five years. Upper-level reservoir projects include adding a second seismically secure tank at the Crest 800 site, replacing the west tank at Willamette 800, and rehabilitating the Shasta 800 reservoir.</p>
Site Photos	

Mitigation Action Item E	Rebuild and/or Reinforce Substations
Location	System-Wide
Coordinating Agencies	Bonneville Power Administration
Implementation Timeframe	2024-2029
Estimated Cost	\$50M
Potential Funding Sources	Operational
Hazards Mitigated	All Hazards
Comments	<p>EWEB operates 33 substations that are essential assets for power delivery to our community. EWEB will systematically upgrade critical substations to meet current IEEE standards and seismic codes to increase reliability of these assets to withstand a range of natural disasters. Specific projects planned will: Rebuild Jessen, Hayden Bridge and Santa Clara substations, Expand Thurston and reconfigure Walterville substations. Where full rebuilds are not financially viable, EWEB will continue seismic anchoring of key substation structures and upgrade protection equipment and security measures.</p>
	

Mitigation Action Item F	Grid Hardening
Location	High Fire Risk Zones (upriver, south Eugene)
Coordinating Agencies	Eugene-Springfield Fire Department, McKenzie Fire, Lane County, Oregon Department of Forestry
Implementation Timeframe	On-Going
Estimated Cost	\$8M
Potential Funding Sources	Federal grants (IIJA, FEMA HMGP), Oregon Department of Energy
Hazards Mitigated	Wildfire, Winter Storm, Windstorm
Comments	Per EWEB's approved Wildfire Mitigation Plan, utilize enhanced vegetation management practices, advanced technology and fire-resistant equipment to improve early detection, response and resiliency to wildfires and other severe weather events. Efforts are targeted towards High Fire Risk Zones (see orange shaded areas below). EWEB is part of a consortium that was recently awarded Federal Grid Resiliency and Innovation Partnership grant funds to support the utility's wildfire mitigation work. Grant funding will be used to conduct a comprehensive, updated wildfire risk assessment and acquire technology solutions that reduce risk in areas with high wildfire potential.
Site Photos	

Mitigation Action Item G	McKenzie Floodplain Restoration
Location	Middle McKenzie Valley
Coordinating Agencies	US Forest Service, McKenzie Watershed Alliance, McKenzie River Trust
Implementation Timeframe	2024-2029
Estimated Cost	\$4M
Potential Funding Sources	Federal Grants (NOAA, EPA, USDA) and Oregon Watershed Enhancement Board
Hazards Mitigated	Flood, Wildfire, Earthquake, Landslide
Comments	Conduct floodplain and riparian restoration with focus on drainages with high risk of sediment and debris flows during heavy rain events, such as Quartz, Gate, Martin and Ennis creeks. These floodplain enhancements slow and absorb rainfall before it enters the McKenzie River, protecting water quality and reducing flooding, and have been effective as firebreaks to protect nearby infrastructure from wildfire. \$7.5M in grant funding was secured from the National Oceanic and Atmospheric Administration (NOAA) to support floodplain improvements in the Quartz Creek drainage.
Site Photos	

Mitigation Action Item H	Leaburg Canal Mitigation
Location	Leaburg
Coordinating Agencies	Federal Energy Regulatory Commission
Implementation Timeframe	2025-2029
Estimated Cost	\$40.6M
Potential Funding Sources	Federal grants (FEMA, IIJA funds)
Hazards Mitigated	Earthquake, Landslide, Flood
Comments	Although the Leaburg canal has been out of service for power generation since 2018, the canal is still needed to manage stormwater outfall from several creeks. EWEB is required to meet all dam safety rules and regulations for this facility and has plans to reduce near term risk of potential failure of the canal embankment due to hydrological, seismic or landslide events. Planned work involves relieving hydraulic loading of the canal embankment by reconfiguring portions of the canal to isolate and re-route tributary and stormwater flows intercepted by the canal to new and upgraded outfall locations. The work will entail extensive grading and drainage structure improvements.
Site Photos	

Mitigation Action Item I	Roosevelt Operations Center (ROC) Seismic Upgrades
Location	Eugene - 4200 Roosevelt Blvd
Coordinating Agencies	N/A
Implementation Timeframe	2025 - 2028
Estimated Cost	\$3M
Potential Funding Sources	Operational - EWEB is not eligible for Oregon Seismic Rehabilitation grants.
Hazards Mitigated	Earthquake
Comments	This critical facility was originally built in 2010/11 for electric and water operations engineering and field crews. With the recent completion of a workforce consolidation effort, the ROC now serves nearly the entire utility office space and storage needs. This site also hosts the primary EOCs, Dispatch Center and 24-7 Trading Floor. Seismic reinforcement of the operations center, warehouse and fleet buildings are needed so these facilities are more likely to remain operational following a major seismic event. This project was included in the prior MJNHMP but uncompleted due to competing priorities.
Site Photos	

Mitigation Action Item J	EWEB Building Evacuation and Continuity of Operations Plans
Location	Roosevelt Operations Center, Hayden Bridge Filtration Plant
Coordinating Agencies	City of Eugene, other area utilities, OR Office of Emergency Mgmt.
Implementation Timeframe	2025-2027
Estimated Cost	\$300,000
Potential Funding Sources	Operational
Hazards Mitigated	All Hazards
Comments	EWEB does not have a current corporate-wide plan for continuing essential functions and operations after a prolonged disruption. The existing business continuity plan is outdated and insufficient in content. A formal Continuity of Operations Plan (COOP) is needed to build organizational resilience and speed recovery from various natural hazards and disruptions to mission-critical functions. In preparation for a new COOP, the building evacuation plans for the Roosevelt Operations Center and Hayden Bridge Plant will be updated.

Section 13.5: Plan Implementation and Maintenance

Section 13.5.1: 2020 - 2024 Mitigation Action Progress Report

Through EWEB’s Board-approved capital improvement plans, the utility has completed many of the mitigation action items described in the 2020 MJNHMP, with just a few more complex, multi-year projects carrying over into this planning cycle. Progress status on each MAI is described in the tables on the following page.

Mitigation Action Item	2020.36 - Upgrades - Currin Substation
Location	Eugene
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2022-2024
Estimated Cost	\$750,000 (seismic components)
Potential Funding Sources	Operational
Hazards Mitigated	Flood Earthquake Wildfire
FEMA NHMP Category	Structure & Infrastructure
Comments	Rebuild Currin Substation to include seismic upgrades and the Institute of Electrical and Electronics Engineers standards to reduce risk of interference with electrical equipment from geomagnetic disturbances.
Progress Since Last Plan	<ul style="list-style-type: none"> • <i>2020 Plan Conclusion Status:</i> Complete 8/30/2024 • <i>Carryover to 2025:</i> No • <i>Accomplishments:</i> Currin Substation was built in 1962 and is a critical hub for power flowing to the downtown grid, Hayden Bridge Filtration Plant and from BPA and Pacific Corporation. The substation was

	<p>completely rebuilt to modern IEEE standards and to handle future load growth. Seismic upgrades include broader and deeper footings for key substructures and flexible components to withstand ground-shaking and other disturbances. Transformers have been welded to a steel plate on top of the foundation for additional seismic protection.</p> <ul style="list-style-type: none"> Challenges: This \$14.8 project was subject to price escalations for equipment and labor but is on schedule for completion in Spring 2024
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Mitigation Action Item	2020.37 - Upgrades Seismic - Roosevelt Operations Center (ROC)
Location	4200 Roosevelt Blvd, Eugene
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2018-2021
Estimated Cost	\$3,500,000
Potential Funding Sources	Operational
Hazards Mitigated	Earthquake Flooding Winter Storm Windstorm
FEMA NHMP Category	Structure & Infrastructure
Comments	Seismically retrofit EWEB's Roosevelt Operations Center (ROC) to remain operational after an earthquake. After completion move EWEB's dispatch into ROC from the EWEB Headquarters and build a new backup Dispatch Center in a seismically sound building near Hayden Bridge.
Progress Since Last Plan	<ul style="list-style-type: none"> 2020 Plan Conclusion Status: Restructured Carryover to 2025: No Accomplishments: The Roosevelt Operations Center (ROC) was primarily built to serve the needs of electric and water operations engineering and field personnel. However, the hybrid work environment enabled the sale of the EWEB Headquarters building and the consolidation of almost the entire utility staff at the ROC. In preparation for the building sale, EWEB relocated its dispatch center to ROC from the EWEB Headquarters (HQ). Furthermore, a new backup Dispatch Center and Trading room have been established in a seismically secure building at the Hayden Bridge Treatment facility. These facilities have a fully redundant operations center for both locations that are online and available with all credentials, network, and physical security tested. More recently, EWEB purchased the adjacent property for additional equipment storage as prudent for emergency response given supply chain issues, and to allow the construction of another entrance/exit to the site. Seismic upgrades to the ROC main building, warehouse, and fleet building are still planned in the coming years. A Seismic Hazard Evaluation was completed in 2018 for the ROC, and design/construction for seismic reinforcement is currently budgeted for 2025-2028. Challenges: Seismic upgrades at the ROC have been delayed due to the office consolidation efforts and other competing priorities for capital funding and planning staff. The primary dispatch center had to be rebuilt at the ROC before the sale of the HQ building, and then a new secondary dispatch site was constructed at Hayden Bridge shortly after the sale of the HQ building in 2023.

Mitigation Action Item	2020.38 - Upgrades - Replace older substation with Holden Creek Substation
Location	Leaburg
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2018-2021
Estimated Cost	\$7,000,000
Potential Funding Sources	Operational
Hazards Mitigated	Earthquake Flooding Landslide
FEMA NHMP Category	Structure & Infrastructure
Comments	Replace older substation with new Holden Creek Substation to include seismic upgrades and the Institute of Electrical and Electronics Engineers standards to reduce risk of interference with electrical equipment from geomagnetic disturbance. This project will replace the Leaburg Substation on the riverbank and move 17 miles of overhead electrical lines.
Progress Since Last Plan	<ul style="list-style-type: none"> • <i>2020 Plan Conclusion Status:</i> Complete • <i>Carryover to 2025:</i> No • <i>Accomplishments:</i> Phase 1 of this project was to build the new substation to current seismic standards and away from the river, re-route power and decommission the Leaburg substation. This work was completed in 2020. To continue to improve reliability to the customers in this area, a second transformer was added in 2021 so that in the event of failure or maintenance needs on the first, power would not be interrupted. The last phase was to remove the several miles of 69 kV overhead electric lines that are no longer needed for service as transmission needs are now met in partnership with the Bonneville Power Administration. • <i>Challenges:</i> Phasing of the project due to competing priorities created some delays with final decommissioning of the old substation and 69 kV line removal. However, delay of the idle electric line allowed time for some additional design work and inclusion of some reconfiguration work in the area for wildfire mitigation benefit.

Mitigation Action Item	2020.39 - Upgrades Seismic - Critical Infrastructure - Baseline Reservoirs
Location	Eugene
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2023
Estimated Cost	\$39,000,000
Potential Funding Sources	Operational
Hazards Mitigated	Drought Earthquake Flooding Landslide Wildfire
FEMA NHMP Category	Structure & Infrastructure
Comments	Replace baseline reservoirs with facilities meeting current seismic codes.
Progress Since Last Plan	<ul style="list-style-type: none"> • <i>2020 Plan Conclusion Status:</i> In Progress • <i>Carryover to 2025:</i> Yes

	<ul style="list-style-type: none"> • Accomplishments: EWEB’s baseline water reservoirs serve the entire community – approximately 200,000 people, hundreds of businesses, 50 schools, and 20 medical facilities. None of the existing reservoirs were built to current seismic standards. This project entailed construction of two new circular water tanks on a 10-acre site near East 40th Ave and Patterson St. These tanks are part of the water system's backbone, serving critical community needs such as fire suppression, health, emergency response, and drinking water distribution in case of an earthquake. These new partially buried tanks can hold up to 7.5 million gallons of water each and were built to robust seismic standards to withstand a Cascadia-level earthquake. A wrought-iron fence will be erected to enclose them for additional security of the water supply. A new 36” water transmission line connects the new tanks to the rest of the drinking water system and upgrades, and the new stormwater pipes will convey runoff from the site. • Challenges: The project is slightly delayed due to challenges with earthwork for both the water tanks and the transmission main construction. Extra effort and care were taken to manage impacts to nearby neighbors from the two years of heavy construction, including on-going communication, modified working hours and construction methods. The project will be completed in 2024.
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Mitigation Action Item	2020.40 - Upgrades - Water Mains to All-Restraint Water Mains
Location	Eugene
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2020 - 2030
Estimated Cost	\$300/ft
Potential Funding Sources	Operational
Hazards Mitigated	Earthquake Landslides
FEMA NHMP Category	Structure & Infrastructure
Comments	Use all-restraint water mains in areas prone to landslides.
Progress Since Last Plan	<ul style="list-style-type: none"> • <i>2020 Plan Conclusion Status:</i> Complete 12/30/2024 • <i>Carryover to 2025:</i> No • Accomplishments: All restraint water mains have been adopted as standard equipment for water main replacement projects system-wide due to earthquake risk. In addition to deploying this equipment during upgrades, EWEB is also using earthquake-resistant joint pipe in areas that are prone to landslides. This equipment has a flexible chain structure to withstand ground movement with less risk of failure than standard ductile iron pipe and was used when replacing about 1500 feet of pipe in the southwest Eugene hills. • Challenges: N/A

Mitigation Action Item	2020.41 - Upgrades - Water Chlorination System
Location	Hayden Bridge Treatment Plant
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2019 - 2020
Estimated Cost	\$3,000,000
Potential Funding Sources	Operational
Hazards Mitigated	Earthquake Flooding Windstorm Winter Storm
FEMA NHMP Category	Structure & Infrastructure
Comments	Replace gaseous chlorine at the filtration plant with an on-site liquid hypochlorite system with a 90 day on-site storage supply.
Progress Since Last Plan	<ul style="list-style-type: none"> • <i>2020 Plan Conclusion Status:</i> Complete 6/30/2020 • <i>Carryover to 2025:</i> No • <i>Accomplishments:</i> In late 2019, EWEB changed how staff at our Hayden Bridge Filtration Plant disinfect drinking water, switching from chlorine gas to a liquid chlorine bleach that is manufactured on-site. The sodium hypochlorite generation system will improve water quality, and it is a proven, effective and safe chlorination method. Resiliency and safety are the primary drivers in the chlorination change. Chlorine gas is toxic and can be hazardous to transport and store. Currently, there are two suppliers of chlorine gas in the West, one in Washington and one in Utah. Any disruption to the transportation system or manufacturing facilities would have a significant impact on our ability to treat drinking water. The new system, which uses coarse salt, water and electrolytic conversion to make sodium hypochlorite (bleach), allows plant operators to store enough salt at the filtration plant to last three months. In addition, this system is much safer for our employees and neighbors than having gaseous chlorine on-site. In March 2020, the scrubber, waste chemicals and associated equipment were removed from the site. • <i>Challenges:</i> N/A

Mitigation Action Item	2020.42 - Upgrades - Replace Transformer Mineral Oil
Location	McKenzie Valley
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2030
Estimated Cost	\$800,000
Potential Funding Sources	Operational
Hazards Mitigated	Earthquake Flooding Landslide
FEMA NHMP Category	Structure & Infrastructure
Comments	Replace mineral oil with nontoxic Fiberglass Reinforced Polymer, a natural ester derived from renewable vegetable oils providing improved fire safety, transformer life, and environmental benefits, in all new transformers to reduce spill risk when poles fall or transformers fail.
Progress Since Last Plan	<ul style="list-style-type: none"> • <i>2020 Plan Conclusion Status:</i> Restructured • <i>Carryover to 2025:</i> No • <i>Accomplishments:</i> EWEB has almost 16,000 transformers in its electric system. As of September 2023, 2,012 have been changed out with new transformers using non-toxic and less flammable FR3 fluids instead of mineral oil. Transformer change-outs will continue over time due to failures/end-of-life replacement and as part of other system upgrades. • <i>Challenges:</i> There have been delays in strategic versus emergency transformer upgrades due to supply chain issues. With the supply chain situation improving, transformer change-outs in areas with higher wildfire risk resumed in early 2024.

Mitigation Action Item	2020.43 - Build - Micro-Grids
Location	Eugene
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2018-2023
Estimated Cost	\$1,000,000
Potential Funding Sources	State Grants (Oregon Dept of Energy - ODOE)
Hazards Mitigated	Earthquake Flooding
FEMA NHMP Category	Structure & Infrastructure
Comments	Establish micro-grids at critical facilities for drinking water distribution and independent electrical operation. Micro-grids at Howard Elementary School and ROC are currently under development.
Progress Since Last Plan	<ul style="list-style-type: none"> • <i>2020 Plan Conclusion Status:</i> Complete 4/30/2022 • <i>Carryover to 2025:</i> No • <i>Accomplishments:</i> With the support of a grant from the ODOE, a 1 MW battery system was installed at Howard Elementary School. This newly built school already had a 50 kW rooftop solar installation, and with high quality groundwater available, was selected as the site of Eugene's second emergency water station. The microgrid system was installed to

	<p>provide power to the emergency well in the event of a power outage. The battery size would allow the well pump to run for at least two weeks to provide drinking water to the public in a catastrophic event. In addition to off-setting electric use at the school, the solar array was intended to trickle charge the battery to extend well pump run-times during emergency operation. The project was substantially completed in May 2019.</p> <ul style="list-style-type: none"> Challenges: This was largely a research and development/proof of concept project for EWEB, which did not have any large batteries in our operating system. The project was designed to test use the batteries for peak load shaving as well as to support the school/well facilities when power was down. During system commissioning, it was discovered that the contractor did not include adequate controls to allow for interface with the sites existing inverter for the solar system. Therefore, neither the functionality to trickle-charge the battery as anticipated, nor the controllers to test all the battery use cases of interest to the utility was feasible. While some of these deficiencies have been addressed through recent firmware upgrades, without additional equipment investment, the project will not meet all the goals as initially intended. Battery safety has become a growing concern, and maintenance costs have been much higher than anticipated. At the same time, utility staff availability for on-going research into the battery/load shifting use cases is limited. For these reasons, EWEB has no current plans to expand development of microgrids to other utility facilities.
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Mitigation Action Item	2020.44 - Analyze - Blackstart Capabilities
Location	Greater Eugene/Springfield Area
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2019-2023
Estimated Cost	\$50,000 per study
Potential Funding Sources	Operational
Hazards Mitigated	Earthquake Landslide Extreme Weather Wildfire Windstorm Winter Storm
FEMA NHMP Category	Structure & Infrastructure
Comments	Test blackstart capabilities, load requirements, and transmission switching needs for Leaburg hydro-electric plant to power critical facilities in Eugene during major outages.
Progress Since Last Plan	<ul style="list-style-type: none"> 2020 Plan Conclusion Status: Complete 9/30/2023 Carryover to 2025: No Accomplishments: EWEB contracted with Black & Veatch to study the capability of its lower-McKenzie generators to meet the emergency load needs if EWEB were to be isolated from larger grid. The study included both identifying critical loads and the black-start capabilities of the generators. This first analysis was completed in 2018, concluding that the Leaburg power plant was properly equipped for blackstart functionality. However, further testing and commissioning was needed since this functional testing was not completed upon commissioning of the plant after the last upgrade. Follow-up studies were completed in 2020 and

	<p>early 2021 which looked at similar functionality for the generators at the International Paper Plant and the University of Oregon. This study found that the generator at the International Paper Plant (owned by EWEB and operated by International Paper) did not have black-start capabilities, however with some investments, the plant at the University of Oregon was viable. To move this concept forward, next steps would include drafting an agreement between each organization laying out the conditions, responsibilities, and other contractual details to develop an agreement between the two agencies. Based on the results of these first analyses, EWEB entered into a new contract with Black and Veach to determine the blackstart capabilities at the Sierra Pine biomass plant. This study was conducted over the summer of 2023 and found that this facility was also blackstart capable and could produce some 16aMW of power.</p> <ul style="list-style-type: none"> Challenges: Since these studies were initiated, the Leaburg power plant has been off-line due to safety concerns associated with the project's earthen canal and the facility is now planned for decommissioning. While the University's diesel and thermal generators may be viable candidates for emergency power supplies, there are challenges moving this forward from a partner project priority perspective. For the Sierra Pine plant, significant investments of over \$4M are necessary to install a blackstart generator and make necessary investments in our distribution system to direct power generated to critical loads. A number of follow-up studies would be needed to better ensure resiliency benefits from this level of investment could be reasonably anticipated, including the Sierra Pine's vulnerability to seismic events.
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Mitigation Action Item	2020.45 - New Build - Electric Line Re-framing and Undergrounding
Location	Greater Eugene/Springfield Area
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2019-2025
Estimated Cost	\$2,700,000
Potential Funding Sources	FEMA Hazard Mitigation Grants
Hazards Mitigated	Earthquake Windstorm Winter Storm
FEMA NHMP Category	Structure & Infrastructure
Comments	Re-frame 4.3 miles of electric line and underground 1.5 miles of line in 15 high outage areas.
Progress Since Last Plan	<ul style="list-style-type: none"> 2020 Plan Conclusion Status: Delayed Carryover to 2025: Yes Accomplishments: EWEB was successfully awarded FEMA Hazard Mitigation Project Grant funds to re-frame 4.3 miles of electric line and underground 1.5 miles of distribution services in high outage areas across Eugene. In the majority of cases, EWEB reconfigured and replaced older overhead power lines that require two wires and replaced them with new, higher capacity cable that requires only one wire. This reduces brown-outs when a tree limb falls on one wire and also allows

	<p>for the removal of crossarms, which are susceptible to falling tree limbs and a common culprit causing outages. A few projects involved undergrounding portions of the overhead services. Overall project costs were estimated at \$2.7M with FEMA grant funding about 75% of those costs.</p> <ul style="list-style-type: none"> Challenges: The majority of projects were completed early in this planning cycle. One of the fifteen projects EWEB identified as a priority to mitigate risk of prolonged electrical outages had to be redesigned/resubmitted to FEMA and was substantially delayed. The redesigned project was ultimately not initiated due to grant deadline concerns as similar projects requiring notification and coordination with residential customers for backyard construction were very time-consuming. A new project to improve both reliability and protect against wildfire has been submitted to FEMA for review and if approved for funding, will be complete prior to March 2026.
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Mitigation Action Item	2020.46 - Build - Emergency Water Distribution
Location	Eugene
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2018-2024
Estimated Cost	\$200,000
Potential Funding Sources	Operational
Hazards Mitigated	Drought Earthquake Wildfire Volcano
FEMA NHMP Category	Structure & Infrastructure
Comments	Develop emergency water distribution sites using seismically sound wells at local schools or community centers.
Progress Since Last Plan	<ul style="list-style-type: none"> <i>2020 Plan Conclusion Status:</i> Complete 12/31/2024 <i>Carryover to 2025:</i> No Accomplishments: EWEB constructed seven emergency water stations at strategic locations to ensure a continued water supply to Eugene residents should the drinking water services be substantially interrupted. These water stations were designed to provide community members with at least 2 gallons of water daily. In collaboration with other public agency partners, stations have been constructed at the Sheldon Fire Station, Lane County Fairgrounds, the Eugene Science Center, Howard Elementary School, and Bethel Farms at Kalapuya High School. Two additional sites are in final design (Amazon Park in South Eugene and Kennedy Middle School in West Eugene) and will be completed in 2024. **EWEB first evaluated water quantity and quality conditions at each site to ensure a viable groundwater supply. Once a site was selected and agency agreements were finalized, EWEB refurbished or installed a well on the site, placed equipment in a self-contained station (shipping container), and ensured the availability of backup power. Additionally, EWEB completed operational testing and community outreach events for each emergency water station.

	<ul style="list-style-type: none"> Challenges: Water quality and quantity obstacles were encountered in the higher populated regions of the southern portion of Eugene. These obstacles were anticipated based on regional groundwater studies and resolved by drilling extra test wells and designing a treatment system to address low levels of arsenic in the groundwater. The project experienced increased costs and extended timelines to design and implement creative solutions to the obstacles. **Other delays were experienced when installing facilities and equipment on property not owned by EWEB. As requested by site owners, additional design and installation costs were experienced to provide aesthetically appealing security screening, and to developing Intergovernmental Agreements before commencing site work.
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Mitigation Action Item	2020.47 - Upgrades Seismic - Substation Equipment
Location	Greater Eugene/Springfield Area
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2019-2027
Estimated Cost	\$4,000,000
Potential Funding Sources	Operational
Hazards Mitigated	Earthquake Wildfire Windstorm
FEMA NHMP Category	Structure & Infrastructure
Comments	Seismically anchor transformers and control buildings and add flexible bus connections at each substation.
Progress Since Last Plan	<ul style="list-style-type: none"> <i>2020 Plan Conclusion Status:</i> Delayed <i>Carryover to 2025:</i> No Accomplishments: In addition to planned substation rebuilds, EWEB prioritized seven substations for seismic reinforcement to protect transformers and other vital equipment against potential damage from a significant earthquake. Upgrades include deeper foundations, oil containment repairs, seismic bracing/anchoring of equipment to the foundations and added flexible bus connections to withstand ground movement. These improvements will prevent equipment movement on the pads during seismic events. This aligns with industry standards and ensures reliability, reducing the need for extensive repairs after earthquakes. **The following substation upgrades have been completed: Adams, Laurel, Hilyard, and Oakway; Jefferson and Monroe substations are under contract for seismic reinforcements in 2024. Challenges: Prioritizing the work over other critical capital projects has delayed some of the progress, and cost escalations required EWEB to postpone one substation upgrade until 2025.

Mitigation Action Item	2020.48 - New Build - Secondary Water Treatment Facility
Location	Springfield
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2023-2030
Estimated Cost	\$50,000,000
Potential Funding Sources	TBD
Hazards Mitigated	Drought Earthquake Flooding Windstorm Winter Storm Volcano
FEMA NHMP Category	Structure & Infrastructure
Comments	Construct a new water filtration plant on the Willamette River for a secondary source of and treatment/delivery option for drinking water.
Progress Since Last Plan	<ul style="list-style-type: none"> • <i>2020 Plan Conclusion Status:</i> Delayed • <i>Carryover to 2025:</i> Yes • Accomplishments: Property acquisition, water rights on the Willamette River and preliminary design has been completed. In 2023, the utility built a new road to improve access to the property for future construction of the facilities. EWEB has secured bond funding necessary for the first phase of this complex project, and initial surveying and environmental investigations to support permitting and design efforts are underway. **Land use and permitting efforts are continuing. Near term goals are to have land use approvals by the end of 2024 and Federal permit applications submitted in 2025 • Challenges: EWEB has made numerous attempts to build a second water treatment plant over the last several decades. In 2017, due to permitting and cost-escalation concerns, EWEB Board members directed staff to postpone planning and funding for the project, and instead focus short-term efforts on developing Emergency Water Stations. Since then, EWEB has worked with community partners to construct five stations, with two more in progress (see Mitigation Action Item #2020.44).

Mitigation Action Item	2020.49 - Build - Mobile Water Treatment Trailer
Location	Greater Eugene/Springfield Area
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2019
Estimated Cost	\$80,000
Potential Funding Sources	Operational/State SPIRE Grants
Hazards Mitigated	Drought Earthquake Wildfire
FEMA NHMP Category	Structure & Infrastructure
Comments	Construct and test a mobile treatment trailer capable of delivering potable water from sources like rivers or pools using a bio-filtration process.
Progress Since Last Plan	<ul style="list-style-type: none"> • <i>2020 Plan Conclusion Status:</i> Complete 1/30/2022

	<ul style="list-style-type: none"> • <i>Carryover to 2025:</i> No • <i>Accomplishments:</i> As part of our emergency water supply plan and to supplement the well-water stations, EWEB acquired a mobile water treatment trailer. This equipment could be used to supply drinking water to residents living in areas where groundwater is unavailable. The goal is to provide about 100 gallons of potable water per minute using a bio-filtration process capable of treating water from rivers, lakes or pools. The trailer would then be connected to the same type of water distribution equipment used for our emergency groundwater well sites where residents can fill containers from the distribution manifold. **The mobile treatment trailer equipment was designed and purchased in 2019; once equipment was received, the utility constructed the trailer and conducted a full-day test. EWEB pumped water out of the Willamette River, treated the water using the equipment in the mobile trailer and took water quality samples with positive results. • <i>Challenges:</i> The project was a bit more expensive than anticipated (\$200,000). With the proof of concept tested, the utility requested another trailer through the Oregon Department of Emergency Management as part of their grant process so we would have two mobile units available. Equipment storage was another issue that needed to be addresses, and covered storage has now been built at the Hayden Bridge Treatment Plant for the treatment trailers.
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Mitigation Action Item	2020.66 - Acquire - LiDAR for Holiday Farm Fire Area
Location	McKenzie Valley
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2021 (Item added mid-cycle after 2020 wildfire season)
Estimated Cost	\$250,000
Potential Funding Sources	FEMA Public Assistance
Hazards Mitigated	Landslides Flooding
FEMA NHMP Category	Natural Systems Protection
Comments	Acquire LiDAR of Holiday Farm Fire impacted areas and update GIS databases with burn assessment data to identify areas of highest risk for landslides and flooding to prioritize restoration actions.
Progress Since Last Plan	<ul style="list-style-type: none"> • <i>2020 Plan Conclusion Status:</i> Complete 12/31/2023 • <i>Carryover to 2025:</i> No • <i>Accomplishments:</i> In partnership with the City of Springfield, USGS and the US Army Corps of Engineers, LiDAR data was collected and analyzed for the bulk of the McKenzie River Watershed and all of Springfield's urban growth boundary. Project partners jointly funded data acquisition and Lane Council of Governments hosts the data which is now available for other public agency partners.**This project provided fundamental analysis to support damage assessment and restoration planning for public and private lands within the Holiday Farm Fire footprint. The data is also being used to help identify areas

	<p>of highest risk for landslide and flooding to prioritize future mitigation work.</p> <ul style="list-style-type: none"> Challenges: None
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Mitigation Action Item	2020.67 - Restore - Floodplain & Riparian Areas
Location	McKenzie Valley
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2021-2025 (Item added mid-cycle after 2020 wildfire season)
Estimated Cost	\$4,000,000
Potential Funding Sources	FEMA Hazard Mitigation Grants, other Federal grants
Hazards Mitigated	Flooding Windstorm Winter Storm
FEMA NHMP Category	Natural Systems Protection
Comments	Conduct floodplain and riparian restoration with focus on drainages with high risk of sediment and debris flows during heavy rain events, such as Quartz and Gate Creeks, to slow and absorb rainfall before it enters the McKenzie River and to protect nearby infrastructure.
Progress Since Last Plan	<ul style="list-style-type: none"> <i>2020 Plan Conclusion Status:</i> In Progress <i>Carryover to 2025:</i> Yes Accomplishments: As part of post-fire watershed restoration effort, the utility is working with numerous federal, state and nonprofit partners to implement large-scale floodplain restoration projects in the middle McKenzie Valley. The primary goal of these projects is to protect drinking water quality from the impacts of wildfires, and to improve ecological function of these complex riparian systems. These floodplain enhancement projects create wetlands and slow-water habitat that hold more water on the land, even during dry conditions, acting as fire breaks that lessen the severity of wildfire on the landscape. Major restoration projects were completed in the last few years on the South Fork McKenzie, Deer Creek, and Gate Creek and Finn Rock reach. Challenges: These are highly complex projects requiring multiple permits and construction timeline constraints for when in-water work can be conducted, while minimizing disruption to sensitive species and water quality. Similar floodplain restoration projects are in design for Quartz and Ennis Creek using a combination of local, state and federal funding sources and this work will carry-over into the next NHMP cycle.

Mitigation Action Item	2020.68 - Protection - Control Erosion Due to Fire
Location	Greater Eugene/Springfield Area
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2021-2025 (Item added mid-cycle after 2020 wildfire season)
Estimated Cost	\$4,000,000

Potential Funding Sources	FEMA Public Assistance
Hazards Mitigated	Flooding Landslides Wildfire
FEMA NHMP Category	Natural Systems Protection
Comments	Assist with watershed scale erosion control and revegetation on private properties in fire damaged areas to minimize landslide and flood risk, particularly in the uplands where burns were more severe.
Progress Since Last Plan	<ul style="list-style-type: none"> • <i>2020 Plan Conclusion Status:</i> Complete 12/31/2023 • <i>Carryover to 2025:</i> No • Accomplishments: Using \$1M of emergency EWEB funding, the utility took the lead in watershed scale erosion control and revegetation on private properties in fire damaged areas to protect water quality and longer term, to minimize landslide and flood risk. Since the Holiday Farm Fire, EWEB and the Pure Water Partners have worked with nearly 300 landowners to assess fire damage, install erosion control devices, hydroseed steep slopes, and replant riparian forests. Over 500,000 trees were planted in 2022 alone. Additionally, fuels reduction projects have been completed on over 500 acres, thinning dead/dying trees and removing invasive vegetation/ladder fuels. EWEB received partial reimbursement for its immediate erosion control work from FEMA (DR-4562) and grant-funding for replanting and fuels reduction projects from State agencies. • Challenges: Scaling up our programs to quickly respond to the immediate needs was challenging. New processes and tools were needed to gain landowner permission to conduct work on private properties, create the forms and data management to track burn assessments and restoration work performed and hire contractors. Initial plantings in 2021 suffered up to 50% loss due to dry conditions that Spring.

Mitigation Action Item	2020.69 - Acquire - Floodplain Properties
Location	Greater Eugene/Springfield Area
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2021-2025 (Item added mid-cycle after 2020 wildfire season)
Estimated Cost	\$2,000,000
Potential Funding Sources	TBD
Hazards Mitigated	Earthquake Flooding Wildfire Winter Storm
FEMA NHMP Category	Natural Systems Protection
Comments	Where landowners are willing, support acquisition of flood-prone properties to minimize future risk to life and property and use natural systems on acquired properties to slow high river flows and mitigate downstream impacts.
Progress Since Last Plan	<ul style="list-style-type: none"> • <i>2020 Plan Conclusion Status:</i> Complete 12/31/2023 • <i>Carryover to 2025:</i> No • Accomplishments: About 700 acres of flood-prone private properties have been acquired at market value and transferred to the McKenzie

	<p>River Trust for restoration and long-term stewardship. Two additional properties are in negotiation and will likely be acquired during the current Mitigation Plan reporting period.</p> <ul style="list-style-type: none"> Challenges: Property values, even post-wildfire, remained very high and even escalated so EWEB pivoted to targeting larger properties that supported planned floodplain enhancement projects. Land use planning regulations have made some potential partial property acquisitions unfeasible as necessary lot line adjustments were prohibited.
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Mitigation Action Item	2020.70 - Build - Early Warning System
Location	Greater Eugene/Springfield Area
Coordinating Agencies	Eugene Water & Electric Board
Implementation Timeframe	2021-2024 (Item added mid-cycle after 2020 wildfire season)
Estimated Cost	\$1,000,000
Potential Funding Sources	TBD
Hazards Mitigated	Wildfire
FEMA NHMP Category	Education & Outreach
Comments	Utilizing existing infrastructure for the ShakeAlert earthquake early warning system, build out early warning systems with cameras and microwave communication links for other hazards to establish a robust alert system tied through redundant communications systems in the McKenzie River area.
Progress Since Last Plan	<ul style="list-style-type: none"> <i>2020 Plan Conclusion Status:</i> Complete 12/31/2024 <i>Carryover to 2025:</i> No <i>Accomplishments:</i> The first Alert Wildfire camera was installed in the upper McKenzie Valley on Smith Ridge in partnership with the University of Oregon in June 2022 (EWEB is hosting the equipment on its communications tower). This camera is part of a network of publicly accessible wildfire cameras for early detection and reporting of fire starts, which is especially helpful in remote areas. The University has also installed a wildfire smoke detector at another EWEB facility in Leaburg as part of a study with the Department of Homeland Security Science and Technology Division.**In addition, EWEB, in cooperation with the U.S. Geological Survey (USGS), maintains an expansive stage/discharge and continuous water quality monitoring network throughout the McKenzie Watershed. This network provides internal and external stakeholders access to real-time information and notifications for tracking rapidly changing surface water conditions. A total of 12 water quality stations, all using multi-parameter water quality sondes, and 13 stage/discharge stations are monitored by EWEB staff year-round. <i>Challenges:</i> Alerting tools for landslide prone zones is delayed pending completion of a first-of-its-kind post-fire landslide risk assessment being conducted by the Oregon Department of Geology and Mineral Industries (DOGAMI). This study will identify areas at

	<p>highest risk for slides as well as where slides would have greatest impact to property and public safety for future mitigation work. EWEB has been unable to obtain on-going funding support for the network of water quality monitoring stations, currently supported through EWEB's watershed recovery surcharge which will sunset in 2025.</p>
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In addition, several other mitigation-related projects not identified in the prior MJNHMP were undertaken, either due to emergent needs and/or re-prioritization of other capital projects. These included:

- River Road Substation Rebuild – new transformer, seismic and control system upgrades (2023).
- Highland Pump Station Upgrade – New, larger, and seismically secure pump station and generator to increase fire flows and sustain water delivery during power outages (2023)
- Shasta 700 Reservoir Rebuild – 2 half million-gallon steel-bolted water storage tanks will replace the 1.75-million-gallon tank built in the 1960's. This project includes associated water main upgrades and will be largely complete in 2024.

Section 13.5.2 Capabilities Assessment

Building resiliency to a range of potential disruptions is a strategic priority for the utility. This is reflected in the utilities strategic plan as well as a newly adopted EWEB Resiliency Policy. Due to the asset-intensive nature of the utility industry, significant investment in the maintenance and replacement of critical infrastructure is needed. These investments are reflected in the 10-year capital improvement plans for the water and electric utility and directly align with the risk-mitigation actions described in this MJNHMP. Over the next five years, EWEB plans \$204M in electric capital projects and \$95M in water system infrastructure upgrades.

Annual Board of Commissioner review and adoption of the capital improvement plans ensures that mitigation action items have both policy-level and financial commitments for implementation. This process also affords a mechanism to explicitly track mitigation project progress in a public meeting setting. Beyond capital improvement planning work that focuses on infrastructure resiliency, EWEB maintains multiple emergency response and risk mitigation plans that complement the MJNHMP. Applicable plans that support MJNHMP implementation include:

- **2024 Electric and Water 10-Year Capital Improvement Plans**
Describes routine capital work like pole and water main replacements, specific upgrades over \$1 million such as reservoir rebuilds, and large multi-year projects typically financed through bonds. The \$615 million electric and \$342 million water plans have a strategic focus on reliability and resiliency.
- **2023 Water Emergency Response Plan and 2020 Risk and Resilience Assessment for Water Systems**
Comprehensive water supply and customer delivery risk assessment, mitigation action and incident-specific response guidance to identified natural hazards and human-caused events.

- **EWEB Wildfire Mitigation Plan**
Identifies areas at higher risk for wildfire and targets operational practices and mitigation activities for these areas to enhance resilience to wildfire and reduce public safety risk. Adopted by EWEB Board annually for submission to the Oregon Public Utility Commission.
- **2018 – 2028 Water Management and Conservation Plan**
Required submission to Oregon Water Resources Board that includes water curtailment response.
- **2021 Drinking Water Risk Communications Plan**
Outlines incident-specific communication strategies and messages to provide timely and accurate information to internal and external stakeholders during water supply disruptions.
- **Emergency Action Plans for Carmen-Smith Hydroelectric Project and Leaburg/Walterville Power Canals**
Provides guidance to EWEB staff and emergency response personnel to safeguard the lives and property of people living near and downstream of EWEB hydroelectric facilities; required and approved by the Federal Energy Regulatory Commission.
- **Mutual Aid Agreements**
 - Lane Mutual Aid Agreement (2017)
 - Western Region Mutual Assistance Agreement (2014)
 - EWEB, Rainbow Water District, and Springfield Utility Board Mutual Aid Agreement (2006)
- **NERC Emergency Operations Plans**
Specifies electric load shedding required under emergency conditions, describes communications methods, and required restoration actions and coordination.
- **Roosevelt Operations Center Emergency Action Plan**
Guidelines and emergency response procedures for EWEB staff to follow in the event of a fire or other emergency impacting this critical facility.

EWEB has a Business Continuity Division with three staff dedicated to resiliency and emergency planning activities. With policy support at the Board level and General Manager level, funding support and staffing, EWEB has a systematic approach to public safety risk reduction that includes operational readiness, community preparedness, and adaptive recovery of critical lifeline services.

Section 13.5.3 Future Needs

As part of our focus on resiliency and emergency preparedness, the utility will be updating its building evacuation plans and seeking subject matter expertise to develop a corporate-wide Continuity of Operations Plan. The future decommissioning of the Leaburg Hydroelectric Project will require significant input and support from regional, State and Federal partners to address numerous transportation, environmental, and economic issues that will need to be resolved as part of the planning and design process.

In addition, EWEB expects to complete a Seismic Hazard Assessment (SHA) for the McKenzie Hydro-Electric Projects in 2024 and will seek FERC approval of the report. The assessment will establish seismic criteria necessary to proceed with the design of fish passage facilities and other improvements at the hydro-electric facilities to ensure new construction meets modern

seismic standards. The timeline for necessary retrofits of existing facilities will be determined following additional stability studies that will be performed to better characterize seismic vulnerabilities using the new criteria from the SHA. These determinations will take considerable time and likely push any seismic retrofit work into a future MJNHMP planning cycle. One exception is a bridge over the McKenzie River at the Carmen-Smith plant. Seismic upgrades to the bridge will begin in 2024 using Oregon Department of Transportation design standards.

Lastly, EWEB is seeking innovative funding solutions to offset customer rate impacts associated with the Second Source Treatment Plant. This includes requests for State support as well as exploring Water Infrastructure Finance and Innovation Act (WIFIA) loans offered through the Environmental Protection Agency.

13.5.4 Public Engagement Campaign Summary:

See attachment 13.7.1 for the full public engagement campaign summary.

EWEB initiated an internal public engagement campaign and participated in collaborative public engagement campaign with the Cities, and Rainbow Water District as part of the 2024 plan renewal. Campaign focus areas included:

- Orientation to natural hazard mitigation process
- Transition to County multi-jurisdictional natural hazard mitigation plan (MJNHMP) as an annex plan
- Overview of EWEB hazard risk assessment results
- Overview of selected EWEB mitigation action items
- Solicitation of feedback from public and cooperators

The following outlines EWEB sponsored events/activities as part of the campaign.

Table 13.6.8: Public Engagement Events/Activities

Date, Time	Sponsor	Type	Intent	Audience
06/28/24	EWEB	Digital Communication & Survey	Notify EWEB Customers of MJNHMP Annex, transition to County MJNHMP and solicitation for feedback. EWEB Newsletter – 68,000 (sent 2x), Preparedness Newsletter – 5,100	EWEB Customers
08/18/24	EWEB	Community Event	FAN Neighborhood Annual Picnic - Preparedness information, advertise NHMP annex plan and public survey	EWEB Customers Total 25
09/07/24	EWEB	Community Event	South Eugene Neighborhood Annual Picnic - Preparedness information, advertise NHMP annex plan and public survey	EWEB Customers Total 25
08/28/24	Multi-Agency	Media Release & Digital Survey	COE on behalf of multi-agencies announce MJNHMP presentations, COE/COS public feedback survey, access to draft annex plans, transition to County MJNHMP	Public & Cooperators
09/04/24, 6-8pm	Multi-Agency	Presentation – In Person	NHMP Presentation - NHMP overview, transition to County plan, individual agency introduction	Public & Cooperators Total 4

Sections:

- A. Overview
- B. Public Engagement Events/Activities
- C. EWEB Public Feedback Survey Summary
- D. COE/COS Public Feedback Survey Summary
- E. Conclusion

Abbreviations:

- EWEB – Eugene Water & Electric Board
- COE/COS – City of Eugene/City of Springfield
- MJNHMP – Multi-Jurisdictional Natural Hazard Mitigation Plan

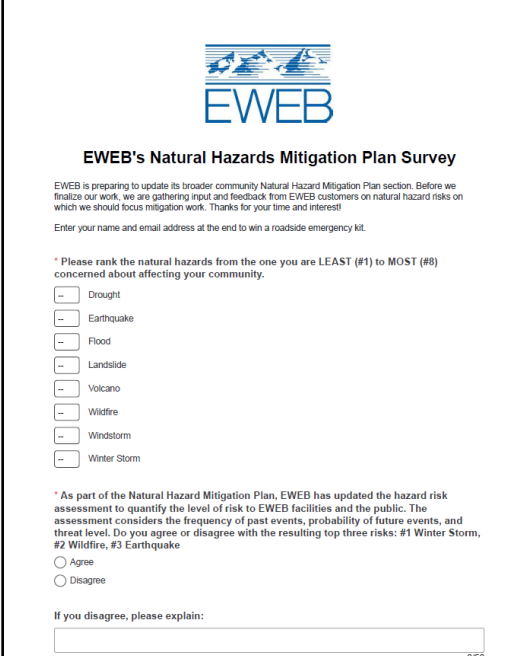
A. Overview:

EWEB initiated a customer (public) engagement campaign and participated in collaborative public engagement campaign with the cities of Springfield and Eugene and Rainbow Water District as part of the 2024 plan renewal.

- Campaign Focus Areas:
 - EWEB Communications/Newsletters:
 - Access (website) to EWEB updated NHMP Annex Plan for review and notice of transition to County multi-jurisdictional natural hazard mitigation plan (MJNHMP)
 - Overview of EWEB hazard risk assessment results
 - Overview of selected EWEB mitigation action items and review of prior plan items
 - Solicitation of feedback from public and cooperators on the campaign focus areas via survey and in-person feedback during in-person events
 - Community Presentation:
 - Orientation to natural hazard mitigation process
 - Transition to County MJNHMP as an annex plan
 - Review/access to individual annex plans for review and introduction to each agency

EWEB chose to host their own customer public feedback survey due to the significant number of mitigation action items, shifting to a new hazard risk assessment tool to align with the County MJNHMP and transitioning to the County MJNHMP. The results as noted below demonstrate both EWEB and our customers (the public) are aligned in concerns about hazards and prioritization of continuing these efforts to harden our infrastructure and policies to withstand the impacts of natural events and quickly recover from them.

The Cities of Eugene and Springfield also sponsored a public feedback survey process which included EWEB; the summary of the multi-agency survey is reflected in section D of this summary report.



The image is a screenshot of a survey form titled "EWEB's Natural Hazards Mitigation Plan Survey". At the top, there is the EWEB logo, which consists of a stylized blue mountain range above the word "EWEB" in blue capital letters. Below the logo, the title "EWEB's Natural Hazards Mitigation Plan Survey" is centered. The text below the title reads: "EWEB is preparing to update its broader community Natural Hazard Mitigation Plan section. Before we finalize our work, we are gathering input and feedback from EWEB customers on natural hazard risks on which we should focus mitigation work. Thanks for your time and interest!" Below this is a line for "Enter your name and email address at the end to win a roadside emergency kit." The main section of the survey asks: "* Please rank the natural hazards from the one you are LEAST (#1) to MOST (#8) concerned about affecting your community." There are eight checkboxes, each followed by a hazard name: Drought, Earthquake, Flood, Landslide, Volcano, Wildfire, Windstorm, and Winter Storm. Below these is a section for agreement: "* As part of the Natural Hazard Mitigation Plan, EWEB has updated the hazard risk assessment to quantify the level of risk to EWEB facilities and the public. The assessment considers the frequency of past events, probability of future events, and threat level. Do you agree or disagree with the resulting top three risks: #1 Winter Storm, #2 Wildfire, #3 Earthquake". There are two radio buttons: "Agree" and "Disagree". Below this is a text box for "If you disagree, please explain:" with a small "0/50" character count indicator at the bottom right.

B. Public Engagement Events/Activities

1. EWEB Sponsored Events/Activities:

Date/Time	Type	Intent	Audience
06/28/24	Digital Communication & Survey	Notify EWEB Customers of MJNHMP Annex, transition to County MJNHMP and solicitation for feedback. - EWEB Preparedness Newsletter (subscription) - Current Connections Newsletter (all customers, 07/08/24, 08/05/24)	EWEB Customers - 5,100 - 68,000 (sent x2)
08/18/24	Community Event	FAN Neighborhood Annual Picnic Attendance - Preparedness information, advertise NHMP annex plan and public survey	EWEB Customers - 25 Attendees - 25 Attendees
09/07/24	Community Event	South Eugene Neighborhood Annual Picnic Attendance - Preparedness information, advertise NHMP annex plan and public survey	EWEB Customers - 25 Attendees

2. Eugene/Springfield Multi-Agency Sponsored Events/Activities:

Date/Time	Type	Intent	Audience
08/28/24	Media Release & Digital Survey	City of Eugene (COE) on behalf of multi-agencies announced NHMP presentation, COE public feedback survey, access to draft annex plans, and transition to the County MJNHMP.	Public & Cooperators - 59 Completed Surveys
09/04/24, 6-8pm	Presentation – In Person	NHMP Presentation - NHMP overview, transition to County plan, individual agency introduction to their annex plans. *EWEB was the facilitator and presenter of the community presentation.	Public & Cooperators - 4 Attendees

C. EWEB Public Feedback Survey Summary

EWEB Survey Information – 5 Questions		Returned Survey Information	
Survey Release Date/# of Weeks	06/28/24, 10 wks	Average Years of Service	35 Years
Survey Link – NHMP 2024 Public Survey		Participant Zip Code Reference	
# of Returned Surveys	145	- Eugene	124/86%
Distribution - EWEB:		- Creswell	1/1%
- Current Connection Newsletter	68,000	- Springfield	12/8%
- EWEB Preparedness Newsletter	5,100	- Vida	4/3%
- Website Posting		- Walterville	4/3%

1. Plan Risk Agreement: Do you agree with our top 3 assessed risks? #1 Winter Storm, #2 Wildfire, #3 Earthquake

Agree	106	73%
Disagree	39	27%

2. Residential Risk: Is your home/property at risk for the items listed below? = Yes Response		
Winter Storm	118	81%
Earthquake	93	64%
Wildfire	93	64%
Windstorm	84	58%
Drought	49	34%
Flooding	30	21%
Landslide	21	14%
Unknown	12	8%

3. Residential Risk: Which hazards are you most concerned about?		
Wildfire	71	49%
Winter Storm	31	21%
Earthquake	26	18%
Drought	5	3%
Flooding	4	3%
Undetermined	4	3%
All	1	1%
Tree Damage	1	1%
Windstorm	2	1%

4. Residential Level of Preparedness: What do you feel is your level of preparedness?				
-	Somewhat	84	58%	(prepared for 3-7 days)
-	Very	35	24%	(prepared for more than a week)
-	Not at all	26	18%	(prepared for 0-2 days)

5. Making sure EWEB can continuously provide power, and water is our top priority. From your perspective, SELECT the TOP 5 actions from the list below that EWEB should be doing to reduce natural hazard risks.		
- Strengthen critical water facilities (reservoirs, pump stations, major water mains)	120	83%
- Strengthen critical electric facilities (substations, major power lines)	115	79%
- Ensure redundant back up power supplies to critical EWEB facilities	103	71%
- Ensure there is local energy generating plants to serve our community in an emergency	93	64%
- Work with other agencies to strengthen critical communications infrastructure	74	51%
- Help facilities that care for our most vulnerable community members be more prepared for outages	57	39%
- Help residential customers be more prepared for service outages	54	37%
- Remove/relocate facilities away from hazard areas	37	26%
- Collect and share more data about hazard areas and risks to utility services	27	19%

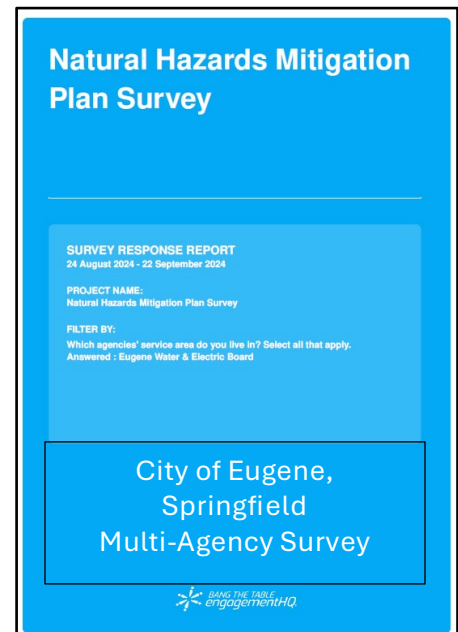
D. COE/COS Public Feedback Survey Summary

COE/COS utilized 2023 Lane County Emergency Management MJNHMP public engagement survey template for continuity of public feedback. Below summarizes 3 of the questions like those asked by the EWEB survey and/or are relatable to public utility infrastructure. The full survey summary is available for review upon request.

Survey Release Date/# of Weeks	08/28/24 4 wks
# of Returned Surveys	59
# EWEB Customers Completed Surveys	29

1. Residential Risk: Which hazards are you most concerned about?					
Hazard	Unsure	Not at All	Not Very	Some-what	Very
Wildfire		1	4	16	38
Extreme Heat		2	5	17	35
Smoke		1	6	17	35
Winter Storm			2	26	31
Earthquake		3	7	22	27
Haz. Materials	2	4	21	14	18
Drought		4	13	28	14
Dam Failure	2	10	16	18	13
Windstorm		2	4	40	13
Pandemic		7	15	25	12
Flood		3	21	27	8
Landslide		14	29	13	3
Tsunami		32	18	8	1
Volcano		19	28	11	1

2. What are the top 3 things Lane County should do to reduce risk from natural hazards?		
- Strengthen infrastructure	52	88%
- Help citizens reduce their individual risk to natural hazards	26	44%
- Provide more information to the public about risks to natural hazards	23	39%
- Restore natural floodplains and open space	21	36%
- Reduce development in known hazardous areas	19	32%
- Build or improve man-made protections	10	17%
- Strengthen public buildings	9	15%
- Collect more data and information about hazard areas	8	14%
- Increase safety requirements for building permits	7	12%



3. From your perspective, how vulnerable are each of the following community assets?					
<i>Community Asset</i>	<i>Not Vulnerable</i>	<i>Not Very Vulnerable</i>	<i>Neutral</i>	<i>Somewhat Vulnerable</i>	<i>Very Vulnerable</i>
Infrastructure – Damage or loss of bridges, utilities	0	0	4	17	37
Environmental – Damage or loss of forests,	1	1	2	25	29
Human – Loss of life and/or injuries	0	1	5	25	27
Economic – Business closures and/or job losses	1	1	3	27	26
Governance – Ability to maintain order and/or		4	4	29	21
Cultural/Historical – Damage or loss of libraries, community service buildings	1	6	16	27	8

E. Conclusion:

EWEB continues to value feedback from our customers/public in long-term resiliency concepts associated with natural hazard risks. The two summarized feedback surveys serve as confirmation that both our customers/public and our agency leadership are aligned on hazard risk and mitigation strategies. The survey takeaway demonstrates customers/public agree with both our highest hazard rankings and the focus of our investments to mitigate these risks. EWEB is eager to collaborate on a larger scale with the County and other area partners on education and outreach opportunities to support our community with their personal preparedness understanding and efforts.

**RESOLUTION NO. 2503
MAY 2025**

**EUGENE WATER & ELECTRIC BOARD
ANNEX TO THE LANE COUNTY MULTI-JURISDICTIONAL
NATURAL HAZARD MITIGATION PLAN**

WHEREAS, the Eugene Water & Electric Board (EWEB) recognizes the threat that natural hazards pose to people and property within the County of Lane, and;

WHEREAS, EWEB has prepared an updated hazard mitigation plan, hereby known as Natural Hazard Mitigation Plan, annex to the Lane County Multi-Jurisdictional Natural Hazard Mitigation Plan in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, the National Flood Insurance Act, and the National Dam Safety Program Act, and;

WHEREAS, the Natural Hazard Mitigation Plan identifies mitigation goals and actions to reduce long-term risk to people and property in EWEB service area from the impacts of future hazards and disasters, and;

WHEREAS, through adoption, EWEB demonstrates its commitment to achieving the goals and mitigation actions outlined in the EWEB Annex, May 2025, to the Lane County Multi-Jurisdictional Natural Hazard Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED by the Eugene Water & Electric Board that the Board hereby adopts the EWEB Annex to the Lane County Multi-Jurisdictional Natural Hazard Mitigation Plan.

DATED this 6th day of May 2025.

THE CITY OF EUGENE, OREGON
Acting by and through the
Eugene Water & Electric Board

President

I, ANNE M. KAH, the duly appointed, qualified, and acting Assistant Secretary of the Eugene Water & Electric Board, do hereby certify that the above is a true and exact copy of the Resolution adopted by the Board at its May 6, 2025, Regular Board Meeting.

Assistant Secretary