Section 13: Eugene Water & Electric Board

to the Lane County Multi-Jurisdictional
Natural Hazard Mitigation Plan

DRAFT: June 2024

Section 13.1: Jurisdictional Profile and Background

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 estimate[1])
- **Land area served**: 236 square miles
- **Land area owned**: 44 square miles

EWEB has participated in the Eugene-Springfield NHMP 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 NHMP to ensure their eligibility to participate in the programs outlined within the Stafford Act. The plan was renamed to "City Eugene and City of Springfield Multi-Jurisdictional Natural Hazards Mitigation Plan" (COE/COS NHMP). In May of 2020 the next plan was successfully renewed with approval by FEMA.

In 2023, as the COE/COS plan holders were meeting to update their plan, Lane County completed their successful renewal process, which included three utility providers as annex plan holders. In early 2024 the COE/COS NHMP 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 catastrophic Oregon wildfires identified the need for more collaborative and integrated processes for preparedness, mitigation, response and recovery among regional jurisdictions.

[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.

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

- Continuity of risk assessment process among the majority of jurisdictions that are already incorporated within the county NHMP – 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 13.2: 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 costs[2] 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 13.1 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.

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 NHMP. 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

[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.

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 13.3: 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 13.2: 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 Eugene-Springfield Multi-Jurisdictional NHMP 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 NHMP. 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 13.3. EWEB 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

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 13.5: Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Incident Timeframe	Preliminary Damage Assessment (EWEB)	Estimated Damage (Lane County)
Severe Winter Storm	TBD	January 12 – 27, 2024	$8M	TBD
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 13.5 presents the ranking of hazards of concern to EWEB using the quantification method developed by Oregon Office 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.

Hazard	History (WF x 2)	Probability (WF x 7)	Vulnerability (WF x 5)	Max Threat (WF x 10)	Total Risk Score	Ranking/ Rating
Winter Storm	18	63	40	80	201	1/High
Wildfire	16	56	35	80	195	2/High
Earthquake	6	28	50	100	184	3/High
Extreme Weather	16	63	30	50	159	4/Moderate
Windstorm	12	35	40	70	157	5/Moderate
Flood	12	49	20	70	151	6/Moderate
Landslide	2	28	20	50	100	7/Moderate
Drought	16	49	10	20	95	8/Moderate
Volcano	4	14	25	40	83	9/Low

Section 13.3.2: Individual Hazard Discussions

As the table above indicates, EWEB's risk ranking very similar to the Lane County Planning area. However, some variations exist due to differences in the vulnerability and maximum threat to our assets and customers to the 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. These differences are explained below.

Drought [Rating #8 – Score 95 out of possible 240, Moderate Rating]

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 Plan 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. For these reasons, drought risk is considered **low** (reduced from moderate from prior plan).

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.

Earthquake [Rating #3 – Score 184 out of possible 240, High Rating]

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 Walterville. 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, with lesser effects to our upriver territory. Extensive damage to electric, water and communications infrastructure is expected, particularly in areas where soil liquification is likely. Studies indicate that areas between east Springfield and Walterville have high susceptibility to liquification.

Oregon Office of Emergency Management estimates there is a 37% chance of 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 and therefore, earthquake risk is **very high**.

Extreme Weather [Rating #4 – Score 159 out of possible 240, Moderate Rating]

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 mute 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. For this reason, extreme heat risk is ranked as **moderate.**

Flood [Rating #6 – Score 151 out of possible 240, Moderate Rating]

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 NHMP, 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. Given limited past damage and current capabilities, flood risk to EWEB is ranked as **moderate.**

Landslide [Rating #7 – Score 100 out of possible 240, Moderate Rating]

Portions of EWEB's service territory with steep slopes are susceptible to landslide activity. This is exacerbated in areas impacted by the Holiday Farm and other 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. Relative to other hazards, landslide risk is ranked as **low.**

Volcano [Rating #9 – Score 83 out of possible 240, Low Rating]

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. Due to the small probability of future occurrences and limited impacts, volcano hazard is ranked **low**.

Wildfire [Rating #2 – Score 195 out of possible 240, High Rating]

Lane County's 2020 Community Wildfire Protection Plan (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 lightening events and limited access for firefighting resources. Based on historical occurrences, there is a high probability of future wildfire occurrences in the Cascades region[5].

Table 13.7: 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

[5] Lane County Natural Hazard Mitigation Plan (2023).

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. Therefore, despite greater focus on wildfire mitigation, proximity to and increasing frequency of wildfire activity and the potential loss of life results in a continued risk ranking of **high.**

Windstorm [Rating #1 – Score 200 out of possible 240, High Rating]
Windstorms producing sustained gusts of over 40 mph are typically part of a winter or heavy rainstorm event. These events occur with 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 wind events, however overall risk remains **high**.

Winter Storm [Rating #1 – Score 200 out of possible 240, High Rating]
As Table A-4 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.

The 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. Due to the frequency of winter storm events and the high potential for costly damage, winter storm risk is ranked **very high**.

13.4 Mitigation Strategies

The following initiatives are the current mitigation action initiatives that make up EWEB's portion of the Lane County NHMP. EWEB is the lead agency and funding source for these initiatives unless otherwise noted.

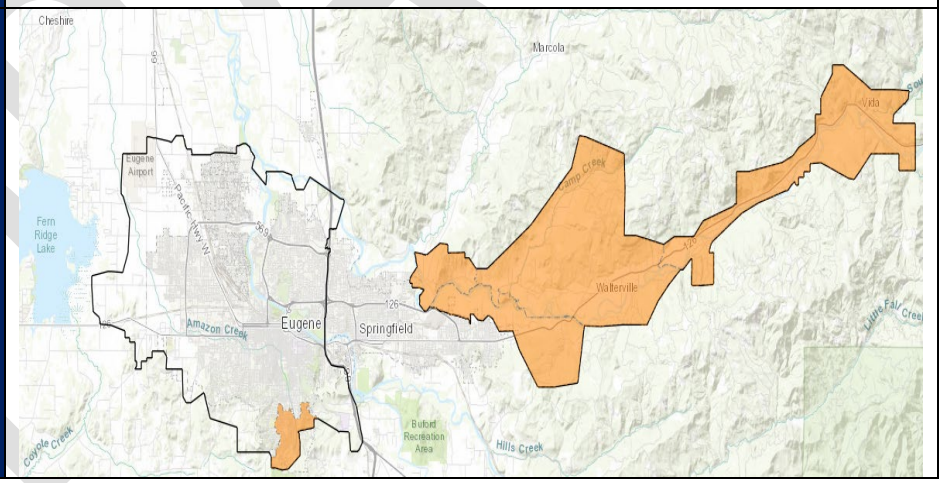
Mitigation Action A	**Second Source Treatment Plant and Transmission Project**
Location	Glenwood, Springfield, Southeast Eugene
Coordinating Agencies	City of Eugene, Springfield and Lane County
Implementation Timeframe	2025-2030
Estimated Cost	$98M
Potential Funding Sources	EPA Water Infrastructure Finance 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 NHMPs, 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 B (39)	**Base Level Reservoir Rebuilds – College Hill**
Location	25th – 27th Lincoln & Lawrence Streets
Coordinating Agencies	City of Eugene, Oregon Health Authority, State of Oregon Historic Preservation Office
Implementation Timeframe	2024-2027
Estimated Cost	$23M
Potential Funding Sources	N/A
Hazards Mitigated	Earthquake, Drought
Comments	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.
Site Photos	

Mitigation Action C	**Water Transmission Main Upgrades and Feasibility Studies**
Location	Eugene Base Level System
Coordinating Agencies	City of Eugene
Implementation Timeframe	2024-2029
Estimated Cost	$15M
Potential Funding Sources	FEMA 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 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 Funds
Hazards Mitigated	Earthquake, Wildfire
Comments	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.
Site Photos	

Mitigation Action E	**Rebuild and/or Reinforce Substations**
Location	System-Wide
Coordinating Agencies	Bonneville Power Administration
Implementation Timeframe	2024-2029
Estimated Cost	$50M
Potential Funding Sources	N/A
Hazards Mitigated	All Hazards
Comments	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.
	

Mitigation Action 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 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	Earthquake, Landslide, Flood, Wildfire
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 to support floodplain improvements in the Quartz Creek drainage.
Site Photos	

Mitigation Action H	**Leaburg Canal Mitigation**
Location	Leaburg
Coordinating Agencies	Federal Energy Regulatory Commission
Implementation Timeframe	2025-2029
Estimated Cost	$29.5M
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 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	None identified, 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 NHMP but uncompleted due to competing priorities.
Site Photos	

Mitigation Action 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	None identified
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 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 NHMP, with just a few more complex, multi-year projects carrying over into this planning cycle.

In addition, several other mitigation-related projects not identified in the prior NHMP 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 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 NHMP. 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 NHMP. Applicable plans that support NHMP 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 in close proximity to 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 (2011)**
  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 NHMP 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.