E. University of Oregon (UO)

NHMP Project Team Member:

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E.1 JURISDICTIONAL PROFILE

E.1.1 Introduction

The University of Oregon (UO), located in Eugene, Oregon, functions like a small community since its opening in 1876. It is a crucial economic component within the State of Oregon, Lane County, and Eugene. The UO is governed by a 15 member board of trustees. The trustees may exercise all powers, rights, duties, and privileges expressly granted by law or that are incidental to their responsibilities. The board is responsible for the adoption of this plan and funding for priority activities. The Executive Leadership team will oversee plan implementation.

In 2006, University of Oregon completed its first Natural Hazard Mitigation Plan. The Plan was subsequently updated in 2011 and 2017. For the 2019 plan update, UO developed an annex to the Eugene-Springfield Multi-Jurisdictional Natural Hazard Mitigation Plan to better align with community partners.

This annex notes the University of Oregon specific variances from the Eugene-Springfield NHMP Base Pan (Sections 1 thru 5). Variance arise due to differing risks faced by UO compared to the Cities of Eugene and Springfield. This is due to university specific regulations, infrastructure, and locations. Unless explicitly expressed by this annex, UO complies with the Base Plan. Public outreach activities are located in Appendix A.

E.1.2 Plan Update Process

UO Emergency Management and Continuity (UOEMC) coordinated the 2019 update of this plan in partnership with the UO's Incident Management Team (IMT) and the Cities of Eugene and Springfield. The information used to develop this plan update drew from a variety of sources.

E.1.3 Campus Profile

The University of Oregon is the second largest employer in Lane County and generates hundreds of millions of dollars in direct spending in the surrounding communities. The campus spans 295 acres with over 100 buildings. In 2019, the University's enrollment included 22,760 students belonging to nine schools and colleges, with 365 degree and certificate programs. The incoming freshman class included 36% that were ethnic and racial minorities. Of all the students enrolled at the UO, approximately 12% are International and approximately 27% are students of color. As of 2019, the UO employed 2,081 teaching and research faculty. With students, faculty, and administrative staff, the UO serves a total of around 30,000 people.

E.1.3.1 Economic Operations

The University is a major learning and economic hub. In the Fiscal Year 2015-16, the UO had an economic return of approximately $2.3 billion. The operating budget is approximately $932 million, with 7.2% of those funds appropriated by the State and $1.6 billion received in campaign gifts. The University also has a $753 million endowment. Research is a core function of the University of Oregon, with $114.5 million awarded in competitive research awards (FY 2015-16). This included 1,136 research proposals submitted through 30 research centers, institutes, and core research facilities. If a disaster event were to occur, it would impact the ability of the university to teach students, continue research projects, and affect one of the economic backbones of Eugene and Lane County.

E.1.3.2 Built Environment

The over 100 buildings located on the 295 acre campus consist of mostly academic, administrative, and research facilities. These buildings employ a variety of structural materials, including concrete, wood, steel, and masonry (both reinforced and unreinforced). Additionally, a single building may contain more than one structural material, especially if that building has been expanded over time.

The most prevalent structural type on campus is concrete frames, representing one-third of all buildings. The majority of the concrete framed buildings were constructed from the 1950s to the 1970s. For many of the smaller buildings, a wood-framed structure is common. While steel frame construction is used frequently on campus, particularly on modern buildings such as HEDCO Education, Lillis, and Knight Law. There are eight (8) buildings on campus with un-reinforced masonry structural systems from the early part of the 20th century: Allen (portion), Condon (portion), Deady, Fine Arts Studio foundry, Friendly, Frohnmayer Music (portion), Gerlinger, Hendricks, Lawrence (portions), and Susan Campbell. These buildings (or portions of buildings) are likely to be the most vulnerable to earthquake damage. Retrofitting buildings to be resilient against such hazards/threats is often costly and time consuming. In order to prioritize which buildings should receive attention a variety of characteristics must be considered: contents,

structural materials, teaching and research functions, historic significance, and the value of the building structure.

E.1.4 Campus Infrastructure

Infrastructure is another feature essential to the development of an effective emergency management strategy. Infrastructure refers to the basic facilities, services, and installations needed for the functioning of a community, such as transportation networks, communications systems, sewer service, and water and electricity distribution lines.

Utilities are distributed across campus in several ways. The UO Central Power Plant (CPS) is the source of steam, chilled water, compressed air, and most of the electricity that services the university. EWEB is the main supplier of electricity to the CPS substation as well as the main supplier of domestic water. A tunnel system provides a network by which the main campus utilities are distributed to buildings. The campus utilities that are distributed through the tunnel system include: steam, electricity, chilled water, communications (telephone and data lines), life safety and security/access, compressed air, and domestic water (limited). Most of the tunnel system is constructed of concrete and is underground; therefore, the tunnels and utility systems within are not exposed to wind and winter storms. However, the tunnels are susceptible to seismic events and flooding and may also be susceptible to human caused threats. The Facilities Department has conducted a vulnerability study for the tunnel system that identified vulnerable areas in which alarms were placed. However, it is impossible to predict how the tunnels will respond to a major seismic event.

Communication and data systems link the UO to itself and the rest of the world. Servers located in the basement of Oregon Hall and the Computing Center house information on students, faculty, and staff. This information is critical in the event of an emergency, such as for evacuation procedures. The communication systems include phone and email, and is crucial in coordinating resources to respond to a major event.

In addition to the tunnel and data systems, natural gas, electrical, domestic water, sanitary sewer, and storm water sewer pipes are buried directly on campus and connect the university to the rest of the City of Eugene. The City of Eugene provides storm water and sanitary sewer services for the university through pipes that are then diverted to the wastewater treatment plant. The stormwater system diverts urban runoff from campus into the City of Eugene's storm sewer system or into the Willamette River. Other utilities are critical for the function of the university, such as the compressed air used in machinery and laboratories across campus. Below Table E-1 summarizes the different sources and distribution of utilities to the UO.

Table E-1 Campus Utilities

Source	Utility	Distribution to Campus	Concerns or Issues
EWEB / UO Central Power Station	Electricity	Tunnel System	The tunnel system is susceptible to flooding and seismic events.
UO Central Plant and five locations on campus	Back-up Generators (Non-CPS generators)	Self-Contained	It is not known if these generators will withstand a seismic or windstorm event. Four of five generators use natural gas which may not be available during earthquake. Finite amount of diesel fuel.
UO Central Plant	Steam	Tunnel System	The tunnel system is susceptible to flooding and seismic events. Water dependent from EWEB.
	Chilled Water	Tunnel System	The tunnel system is susceptible to flooding and seismic events. Water dependent from EWEB.
	Compressed Air	Tunnel System	The tunnel system is susceptible to flooding and seismic events.
EWEB	Domestic Water	Buried Pipes and Tunnel System	Supply only as good as EWEB's ability to distribute. Buried pipes are susceptible to seismic events. The tunnel system is susceptible to flooding and seismic events. EWEB has only ONE source of water to Eugene which is susceptible to damage from forest fire/earthquake.
Computing Center	Communications (telephone and data lines)	Tunnel System	The tunnel system is susceptible to flooding and seismic events.
	Life Safety and Security Lines (call boxes)	Tunnel System	The tunnel system is susceptible to flooding and seismic events.
City of Eugene / Metro Wastewater Management Commission	Sanitary Sewer	Buried Pipes	Buried pipes are susceptible to seismic events.
City of Eugene	Storm water System	Buried Pipes	Buried pipes are susceptible to seismic events. If pipes become clogged, there is a possibility of overflow and back flow.

Source: University of Oregon Campus Operations

E 1.4.1 UO Central Power Plant Capacities

The UO Central Power Plant (CPS) is the main portal for which electricity, water, and steam is provided to the University. The CPS can produce up to 14 megawatts of power using the CoGeneration plant, Combustion Turbine, Steam Turbine, and three 2.2MW emergency diesel generators for one week. On a loss of electrical power from EWEB, the CPS can meet the power demands of all campus buildings served by the CPS electrical distributions system provided that natural gas is still in service. If natural gas is not available from the NW Natural high pressure gas main (such as during an earthquake) the CPS has in-ground diesel fuel tanks that its three emergency diesel generators use for fuel, which allows CPS the ability to still provide electrical power for life safety and designated critical loads up to 6MW. CPS maintains approximately 90,000 gallons of diesel fuel in three in-ground storage tanks, which can support one week of power with all three emergency diesel generators online at full load, or 6 weeks of power at minimum load (taking care of just life/safety operations).

The UO CPS has the capability to purify 20,000 gallons of water using two large Reverse Osmosis units. This water can be used for steam plant makeup, chilled water, or this water could be an emergency source of potable water -- if properly treated and provisions for the distribution of water are made.

Most buildings located on the main campus depend on steam for heating during the winter months. Some dining facilities located on campus depend on steam for food preparation. The university produces enough steam to provide for the demands on campus. CPS has two main boilers (powered by natural gas), with combined capacity of 125,000 lbs per hour of steam production capability that is delivered at 60 psig to the campus. The CoGeneration system uses a heat recovery steam generator (HRSG) that acts as a backup steam source of 55,000 lbs of steam per hour in the event of a loss of both Boiler 1 and Boiler 2. Fuel for CoGeneration plant and both Boilers is normally provided from the NW Natural 400 psig gas main. In the event of a loss of natural gas, the CoGeneration plant and Boilers can easily be switched to run on diesel fuel from in-ground tanks located at CPS. Steam used for academic purposes is produced using the CPS Autoclave system which produces untreated steam in a heat exchanger from the main CPS steam. The Autoclave system steam is distributed to key academic locations on campus via the tunnel system at 100 psig.

E.2 APPLICABLE PLANS AND POLICIES

The university has existing plans and policies that guide and influence business and academic practices, facility use, and safety procedures. Plans and policies already in existence have support from the various departments across campus as well as students and faculty, and are an effective means of implementing emergency management activities. These plans and policies get updated regularly, and can adapt easily to changing conditions and needs. A list of the current plans, along with the last year it was updated is listed below: Table E-2 and E-3 describes each of the campus plans and outlines its relationship to campus emergency management planning. The UO Campus Planning Department provides links to each of the campus planning and policy documents here: https://cpdc.uoregon.edu/policies-and-documents/policies-and-documents/planning-documents.

Table E-2 University of Oregon, Plans, Policies, and Programs

Name	Date of Last Revision	Author/ Owner	Description	Relation to Emergency Plans				Notes
				EOP	Mitigation	Recovery	COOP	
General Plan								
UO Campus Plan Third Addition 2014	2014	Campus Planning & Real Estate	The Campus Plan provides a shared vision for changes to campus by providing the policies and patterns that define the type and extent of future campus	√	√	√	√	Continue to meet and exceed building code standards. Plan should encourage fire-safe construction practices.
Subject and Area Plans								
2003 Development Policy for the East Campus Area	2003	Campus Planning & Real Estate	Establishes guidelines for furture development in the East Campus Area on *university-owned* lands.		√	√		
Campus Outdoor Lighting Plan	2012	Campus Planning & Real Estate	Addresses physical lighting design guidelines for entrances, walkways and parking lots on campus.	√			√	
Campus Outdoor Sign Plan	2013	Campus Planning & Real Estate	Provides guidelines interpreting and implementing Campus Plan Policy 2: Open-space Framework, Landscape Features sub-policy (b).	√		√	√	
Campus Tree Plan	2008	Campus Planning & Real Estate	Describes the intent and implementation of the patterns and policies in the UO Campus Plan relating to tree management.	√	√	√	√	Promote pre-emptive policies to address hazardous trees on campus?
Historic Preservation	Multiple	Campus Planning & Real Estate	UO has multiple plans and policy related to the preservation of historic buildings and resources on campus. These include general policies as well as assessments of specific buildings and resources.	√	√	√	√	Individual plan and document descriptions are available at: https://cpdc.uoregon.edu/policies-and-documents/policies-and-documents/historic-preservation
Telecom Facilities Guidelines	2015	Campus Planning & Real Estate	Establishes placement and design of current and future telecom facilities on campus; Development Policy, Implementation and Transportation Subcommittee	√	√	√	√	Promote hazard resistant utility and telecommunication construction and maintenance methods
Transportation Plan	1976	University Planning	Establishes transportation policies and procedures.	√	√	√	√	Identify safe evacuation routes in high-risk debris flow and critical areas. Identify and evaluate all critical campus transportation routes that could be used in the instance of a natural hazard.

Source: University of Oregon Campus Planning and Real Estate; review and compilation by Community Service Center.

Table E-3 University of Oregon, Plans, Policies, and Programs

Name	Date of Last Revision	Author/ Owner	Description	Relation to Emergency Plans				Notes
				EOP	Mitigation	Recovery	COOP	
Other Planning and Policy Resources								
UO Biennial Capacity Plan 2013-2015	2012	Campus Planning & Real Estate	Determines the University's development capacity and reviews the effectiveness of the overall Campus Plan.		√	√		Include an assessment of natural hazards in siting future projects.
Campus Physical Framework Vision Project	2016	Campus Planning & Real Estate	Presents a comprehensive physical structure for the campus	√	√	√	√	Proposes new emergency circluation routes; preparation of a campus infrastructure master plan.
UO Sustainable Development Plan	2005	University Planning	Outlines future development goals with a sustainable consideration.		√	√	√	Encourage implementation of mitigation activities in a manner consistent with the goals of promoting sustainable ecological management and campus stability
UO Safety & Security Policy	Ongoing	VPFA	Establishes policies for the overall safety and security of campus including inspections, etc.	√	√	√	√	Implement a violence prevention plan that would mitigate potential safety and security issues and damages. Promote building safety through nonstructural improvements.
Campus Construction Standards	2011	Campus Operations	The goal of the Standard is to document institutional experience and knowledge associated with providing maintanable facilities for the campus.		√	√	√	Ensure that new construction plans include nonstructural retrofitting to prevent the impact of natural hazards.
Campus Vulnerabilty Assessment Team (CVAT)	2016	Emergency Management & Continuity	CVAT is a collaborative interdisciplinary effort which conducts site specific assessments that look at safety, security, risk, emergency preparedness, and business continuity.	√	√	√	√	Proposes new policies, procedures, technology, and enhancements to existing services.

SOURCE: UNIVERSITY OF OREGON CAMPUS PLANNING AND REAL ESTATE; REVIEW AND COMPILATION BY COMMUNITY SERVICE CENTER.

E.3 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

This table lists past occurrences of natural hazards affecting the University of Oregon over the past 15 years and the damage received to UO assets for each incident.

Table E-4: NATURAL HAZARD EVENTS			
Type of Event	**FEMA Disaster # (if applicable)**	**Date**	**Preliminary Damage Assessment**
Winter Storm		December 14-15, 2009	N/A
Winter Storm		December 1, 2013	N/A
Winter/Ice Storm		February 1, 2014	$120,000
Winter/Ice Storm	DR-4169	February 6-12, 2014	$29,126
Windstorm		December 10, 2015	$513,000
Winter/Ice Storm	DR-4296	December 14-17, 2016	$258,269
Winter Storm	DR-4432	February 2019	$304,067

E.4 HAZARD RISK RANKING

Table E-5 presents the ranking of hazards of concern, using Vulnerability multiplied by Probability divided by Capacity to calculate and prioritize total risk to the University of Oregon. These are the identified hazards to UO and may vary from those listed in the Base Plan.

Table E-5 Risk Matrix

Vulnerability X Probability/Capacity = Risk Total

Hazard	Vulnerability High = 3 Moderate = 2 Low = 1	Probability High = 3 Moderate = 2 Low = 1	Capacity High Capacity = 3 Moderate = 2 Low=1	Risk Total <1.5 = Low 1.5-2.9 = Moderate 3-4.5 = High >4.5 = Very High	Risk
Earthquake	3	2	1	6.00	Very High
Windstorm	2	3	2	3.00	High
Winter storm	2	3	2	3.00	High
Geomagnetic Disturbance	3	1	1	3.00	High
Wildfire	1	2	2	1.00	Low
Flood - Riverine	2	2	2	2.00	Moderate
Drought	1	2	3	0.67	Low
Landslide	1	1	2	0.50	Low
Volcano	1	1	2	0.50	Low

E.5 EVALUATION OF RECOMMENDED ACTION ITEMS

Table E-6 lists the initiatives that make up UO's hazard mitigation plan. UO is the lead agency and funding source for these initiatives unless otherwise noted.

Table E-6: HAZARD MITIGATION ACTION ITEMS

New Assets	Existing Assets	Hazard Mitigated	Mitigation Action	Estimated Cost	Timeline
	X	Multi-Hazard	Provide outreach and training to students, administrators, faculty, and staff regarding risk reduction and preparedness. The campaign should focus on pertinent information regarding natural hazards, the campus, and what people can do to reduce their own risk	Low	Ongoing
	X	Multi-Hazard	Purchase and install a 1 million gallon fuel tank at Central Power Station	High	Ongoing
	X	Multi-Hazard (earthquake, geomagnetic disturbance, windstorm, winter storm)	Continue redundancy planning for Telecom/Network Services	Low	Long-term
	X	Multi-Hazard (earthquake, geomagnetic disturbance)	Develop proposals and secure funding to complete retro-fit projects for high priority buildings	Low	Ongoing
	X	Multi-Hazard (wildfire, earthquake)	Renovate Hamilton Hall and Walton Hall	High	Ongoing
	X	Drought	Replace aged main water line that runs through campus	High	Long-term
	X	Drought	Drill a well at the Central Power Station as a backup water source	High	Ongoing
	X	Earthquake	Continue to widely publicize and participate in the Great Oregon Shakeout	Low	Ongoing

New Assets	Existing Assets	Hazard Mitigated	Mitigation Action	Estimated Cost	Timeline
	X	Flooding	Install water alarms in basements and ground floors throughout campus, particularly for areas housing sensitive assets or records (Baker Building basement)	Low	Ongoing
	X	Winter Storm	Evaluate and develop new campus Storm Water Management Plan	Low	Long-term
	X	Winter Storm, Windstorm	Maintain and update the Campus Operations Inclement Weather Plan (which includes pre-storm mitigation actions)	Low	Ongoing

Table E-7 below lists the action items contained in UO's hazard mitigation plan and identifies the priority for each item based on probable benefits, funding availability and project timeline. It is not intended to act as a formal cost/benefit analysis.

TABLE E-7: MITIGATION STRATEGY PRIORITY

Provide outreach and training to students, administrators, faculty, and staff regarding risk reduction and preparedness						
Hazards Mitigated	Costs	Benefits	Benefits Equal or Exceed Cost?	Grant Eligible ?	Can be funded under existing programs or budgets?	Priority
Multi-Hazard	Low	High	Yes	No	Yes	Moderate
Purchase and install a 1 million gallon fuel tank at Central Power Station						
Hazards Mitigated	Costs	Benefits	Benefits Equal or Exceed Cost?	Grant Eligible ?	Can be funded under existing programs or budgets?	Priority
Multi-Hazard	High	High	Yes	Maybe	Maybe	High

Continue redundancy planning for Telecom/Network Services						
Hazards Mitigated	Costs	Benefits	Benefits Equal or Exceed Cost?	Grant Eligible ?	Can be funded under existing programs or budgets?	Priority
Multi-Hazard	High	High	Yes	No	Maybe	High
Develop proposals and secure funding to complete retro-fit projects for high priority buildings						
Hazards Mitigated	Costs	Benefits	Benefits Equal or Exceed Cost?	Grant Eligible ?	Can be funded under existing programs or budgets?	Priority
Multi-Hazard	Low	High	Yes	Yes	Yes	High
Renovate Hamilton Hall and Walton Hall						
Hazards Mitigated	Costs	Benefits	Benefits Equal or Exceed Cost?	Grant Eligible ?	Can be funded under existing programs or budgets?	Priority
Multi-Hazard	High	High	Yes	Yes	Yes	High
Replace aged main water line that runs through campus						
Hazards Mitigated	Costs	Benefits	Benefits Equal or Exceed Cost?	Grant Eligible ?	Can be funded under existing programs or budgets?	Priority
Drought	High	High	Yes	Yes	Maybe	Moderate
Drill a well at the Central Power Station as a backup water source						
Hazards Mitigated	Costs	Benefits	Benefits Equal or Exceed Cost?	Grant Eligible ?	Can be funded under existing programs or budgets?	Priority
Drought	High	High	Yes	Yes	Maybe	Moderate

Continue to widely publicize and participate in the Great Oregon Shakeout						
Hazards Mitigated	Costs	Benefits	Benefits Equal or Exceed Cost?	Grant Eligible ?	Can be funded under existing programs or budgets?	Priority
Earthquake	Low	High	Yes	No	Yes	High
Install water alarms in basements and ground floors throughout campus, particularly for areas housing sensitive assets or records (Baker Building basement)						
Hazards Mitigated	Costs	Benefits	Benefits Equal or Exceed Cost?	Grant Eligible ?	Can be funded under existing programs or budgets?	Priority
Flooding	Moderate	Moderate	Yes	No	Yes	Low
Evaluate and develop new campus Storm Water Management Plan						
Hazards Mitigated	Costs	Benefits	Benefits Equal or Exceed Cost?	Grant Eligible ?	Can be funded under existing programs or budgets?	Priority
Winter Storm	Low	Moderate	Yes	No	Yes	Moderate
Maintain and update the Campus Operations Inclement Weather Plan						
Hazards Mitigated	Costs	Benefits	Benefits Equal or Exceed Cost?	Grant Eligible ?	Can be funded under existing programs or budgets?	Priority
Winter Storm, Windstorm	Low	High	Yes	No	Yes	High

E.6 Additional Comments

Since the adoption of the 2014 NHMP, the University of Oregon has completed a number of initiatives to mitigate community risk to hazards of concern. Some of these were listed in the plan, while others were not included at the time. Action Item Updates for the 2019 NHMP are located in Appendix B. Some mitigation initiatives completed and not outlined in this NHMP include:

- 2016 Multi-Hazard Action Item "Replace of the east tunnel to ensure continuity of utilities from the Central Power Plant to the main campus" was completed.
- 2016 Multi-Hazard Action Item "Bean Hall's renovation" was completed in 2018.
- 2016 Wildfire Action Item "Publicize assembly points with signage" was completed.
- 2016 Severe Weather Action Item "Purchase a generator for the Central Kitchen" was completed.
- 2016 Multi-Hazard Item "Conduct appraisals on antiquities and artifacts in library special collections and insure or secure accordingly" was completed.

Appendix A – Public Outreach

1) The Plan will be shared with the University's Incident Management Team, which includes staff from various departments (to see the departments represented please go to https://safety.uoregon.edu/incident-management-team)

2) There will be a general posting on our website https://safety.uoregon.edu/ for three (3) weeks, so that the public can comment.

3) To encourage participation, Safety and Risk Services will post the link to the Plan on AroundtheO -- an internal University of Oregon newsletter that is seen by the majority of our students, faculty, and staff. Below is an excerpt to the AroundtheO Newsletter article.

"The University of Oregon is looking for your input. As part of our process to protect the safety and wellbeing of all students, faculty, and staff on campus, the University is developing an annex to the Eugene-Springfield Multi-Jurisdictional Natural Hazard Mitigation Plan. This annex examines the University's:

- unique characteristics,
- its vulnerability and risk to various natural hazards,
- and action items that will reduce the University's vulnerability to these natural hazards

What is a Natural Hazard Mitigation Plan?

Natural Hazard Mitigation Plans are designed by the Federal Emergency Management Agency (FEMA) to help communities identify their vulnerabilities to natural hazards and create manageable actions to reduce their vulnerability. FEMA supports communities that participate in this process through grants and funding for projects before and after a disaster event happens. By identifying vulnerabilities before a disaster strikes, a community is able to potentially lessen its effects and are better equipped to handle the response and recovery from its impacts. These plans are important tools used by emergency managers, planners, and administrators to improve the resiliency of a community.

Why does this matter to me?

This plan helps to improve the safety and wellbeing of the people within our campus to natural hazard events. And in order to improve the resiliency of the UO's community, we need input from you, our community members. The plan has vulnerabilities and action items that have been determined by the staff of Safety and Risk Services, which cover a wide range of hazards. We want to know what hazards and action items are especially important to community members, so this can be reflected in the plans and efforts made

by University staff. Please go to the link below, review the plan, and give us your comments."