Climate Action Plan 2.0

Appendix 2

Eugene Future Physical Conditions White Paper

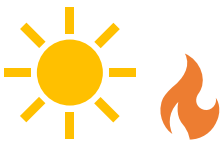
CLIMATE ACTION PLAN 2.0
Changing Climate in Eugene

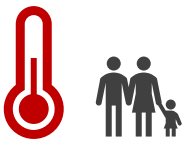
The Challenge and Opportunity of a Changing Climate

This paper discusses the potential changes and impacts we may see in Eugene as a result of climate change. We are already observing physical changes to Oregon's climate, including hotter temperatures, drought, wildfire smoke and less mountain snow. Understanding the areas of greatest risk gives us the opportunity to act rather than react to these changing conditions and helps us be as resilient as possible. The best available science informs us that global average temperature increases must be capped at 2.0°C (3.6°F) to avoid "severe, pervasive and irreversible impacts for people and ecosystems"[1].

How Will Eugene Change?

Climate studies by Oregon State's Oregon Climate Change Research Institute (OCCRI) and Oregon Health Authority outline the likely changes that we can expect in the Eugene and Willamette Valley area. Dry months will be hotter and drier with increased wildfires, and wet months will have more rain and flood, with less snowpack. Overall, weather will be more extreme, and as the climate and environment changes, populations will increase as people move north and inland to milder conditions.





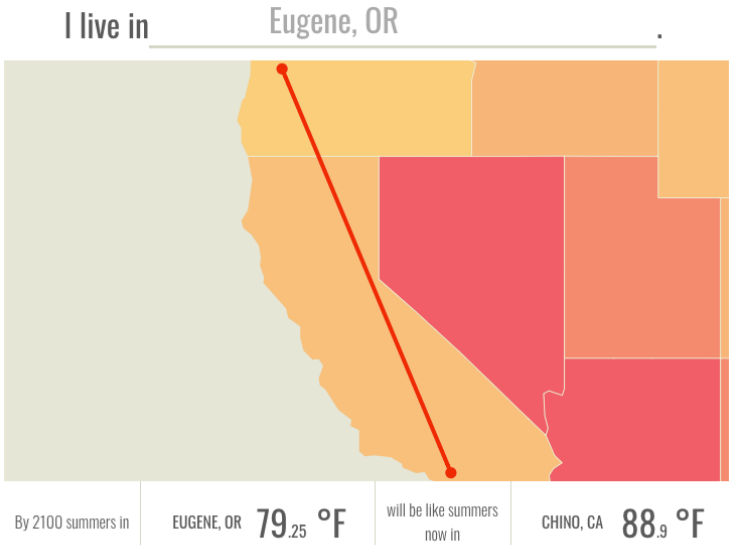
Dry Season	Wet Season	Other
Average summer increase of 10°F -12°F by 2100	Annual precipitation unchanged	Changes in disease patterns
Wildfire surface area increasing by 400-500% by 2040	Snowpack in the Cascades nearly gone by 2040	Population changes and climate migration
Reduced stream flow by 40-60% in summer due to reduced snowmelt by 2040	Rain flows in streams in near real time	Conversion of subalpine forest to other vegetation types by 2080

[1] Intergovernmental Panel on Climate Change, Climate Change Synthesis Report 2014.

Dry Season Changes

Temperature

By 2100, in the Eugene area we can expect that our summer average temperature of 79°F to be more like Chino, California (near Los Angeles) at 88.9°F summer average[2]. Hotter temperatures will disproportionately affect the health of vulnerable populations, including the very young, old, and families in poverty. Additionally, heat and drought will affect forests, rivers, and agricultural land.

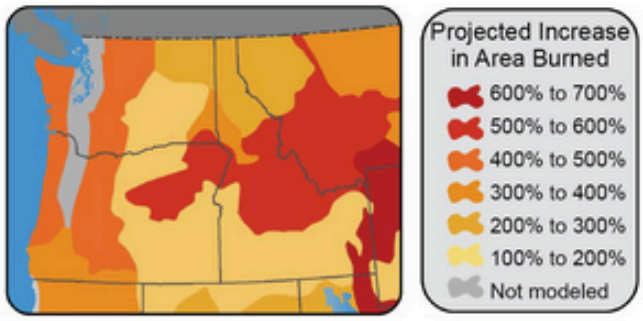


Water

Summer flows in the Willamette River and other waterways are expected to reduce by 40-60% by 2040[3]. This will cause reduced hydroelectric power generation capacity in summer, meanwhile, there will be an increased summer demand for electricity due to higher temperatures and increased population.

Regional Wildfire Risk

The Eugene area is fairly safe from direct burning due to wildfires, although the urban wildland interface (areas close to the boundaries of agricultural and natural resources land) are susceptible. In the past few years, however, we have experienced more wildfire in the Pacific Northwest, a condition that will increase over the next few decades.



OCCRI's analysis has projected the likely scenarios of increased burning in the Northwest. The graphic to the left shows the shift in project increases in fire disturbance. By 2040, we can anticipate a 400% to 500% increase in the number of acres burned[4].

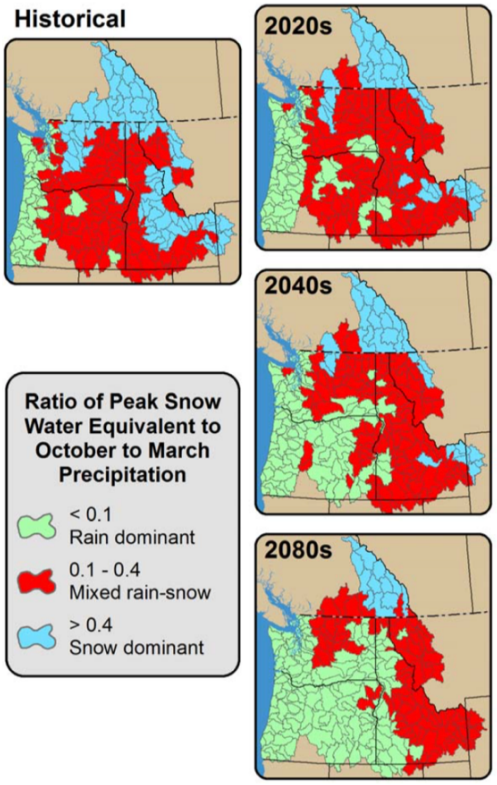
Beyond the threat of local fires, Eugene residents will be exposed to the air quality impacts as surrounding regions burn during the summer months. In the summer of 2017, Oregon residents suffered when winds brought smoke from over 100 fires in British Columbia and multiple Oregon and Washington fires.

[2] Climate Central, Summer Temperatures 1001 Cities Tool.
[3] Climate Change Impacts in the United States: The Third National Climate Assessment, 2014.
[4] Portland General Electric, OCCRI Report, Published as part of PGE's 2016 Integrated Resource Plan.

Wet Season Changes

Regional Precipitation

One of the most significant changes we are already experiencing is the shift in precipitation from snow to rainfall in the winter months. Winter temperatures are expected to increase 3-5°F (1.6-2.8°C) by 2100[5]. The graphic to the right shows the shift from the blue (snow dominant) and red (mixed rain-snow) in many areas to green (rain dominant)[6].



Eugene is rain dominant, but the winter snow in the Cascades serves as storage for our rivers, streams, and groundwater. The reduction in snowfall means that in the summer months, our rivers and streams will not have the same quantities of flowing water from the melting snow. This lower volume of water means pressures on our water supply, agricultural irrigation, habitat for fish species like salmon and trout, water supply to power hydroelectric electricity, and water recreation such as boating, fishing and rafting that provide helpful cooling during heat waves. Ultimately, we will need to become more resourceful in our collective use and reuse of this resource.

Past and Future Flood Risk

Over time rain events are likely to become more intense. Eugene has experienced flooding in the past, and previously flooded sites are the most susceptible to flood again. Flood risk for Eugene is focused on areas where rivers and streams are adjacent to land, as well as low-lying areas, and wetlands – and more so on the area north of the Willamette river than the area south of the river.

Other Changes

Population Increase

The population in Lane County and Eugene is expected to increase steadily, and within the next two decades there will be more Lane County residents living inside Eugene than outside.

Population[7,8]	Eugene	Lane County
2017	167,780	370,600
2035	224,712	428,816
2065	273,234	513,982

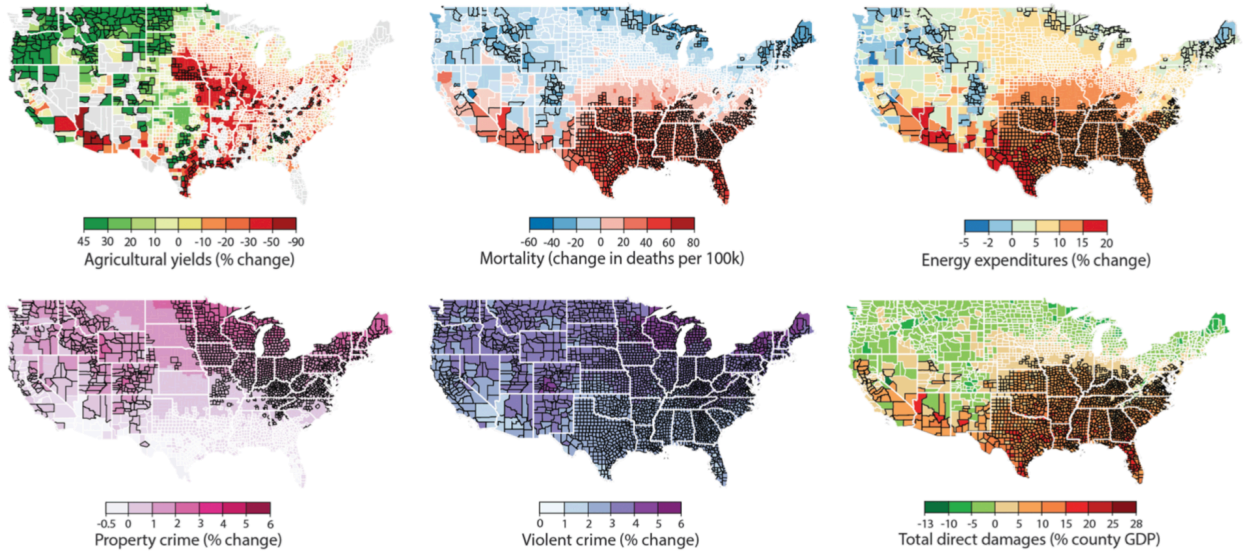
Eugene and Oregon will experience physical climate changes differently than other parts of the country. In

[5] Climate Change Impacts in the United States: The Third National Climate Assessment, 2014.
[6] Portland General Electric, OCCRI Report, Published as part of PGE's 2016 Integrated Resource Plan.
[7] Portland State University Population Estimates
[8] Portland State University Coordinated Population Forecast

many ways, our region is less vulnerable to more significant climate impacts than other parts of the U.S. and other countries. Without strong action, many parts of the world will become uninhabitable due to sea level rise, flooding, high temperatures, drought, loss of drinking water supply, and cascading effects to food production. The desirability of our area could lead to significant migration as other areas become less comfortable or uninhabitable.

Northwest is Less Vulnerable than Much of the United States

While the pacific northwest can expect a fair amount of changes, effects from climate change should be milder than the majority of the country. Agricultural yields, mortality, energy expenditures, and total direct damages should all be mild or favorable in the region by comparison. These are a few of the reasons that Eugene can expect an influx in population. On the other hand, property crime and violent crime are likely to increase.



Estimating economic damage from climate change in the United States Hsiang et al., Science 356, 1362–1369 (2017) 30 June 2017.

Sources and Links

Climate Central. 2014. 1001 Blistering Summers. http://www.climatecentral.org/news/summer-temperatures-co2-emissions-1001-cities-16583

Climate Central. 2017. Cities Are Already Suffering from Summer Heat. Climate Change Will Make It Worse. http://www.climatecentral.org/news/hot-summers-cities-climate-change-21676

Intergovernmental Panel on Climate Change. 2014. Climate Change 2014 – Synthesis Report: Summary for Policymakers. http://www.ipcc.ch/report/ar5/syr/

Oregon Climate Change Research Institute http://www.occri.net/

Portland General Electric. OCCRI Report for 2016 Integrated Resource Plan. https://www.portlandgeneral.com/our-company/energy-strategy/resource-planning/integrated-resource-planning

U.S. Global Change Research Program. 2017. Fourth National Climate Assessment (NCA). See: https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf

Portland State University Population Estimates https://www.pdx.edu/prc/population-reports-estimates

Portland State University Population Forecast https://www.pdx.edu/prc/sites/www.pdx.edu.prc/files/Lane_Forecast_Report_201506.pdf