



Information Paper: Changing Physical Conditions in Milwaukie as a Result of Climate Change

The Challenge and Opportunity of Our Generation


We—the Milwaukie community—have an opportunity to act on climate change and together, create a plan for our future. Climate change is an undesired yet real and urgent challenge facing our planet that results from increased greenhouse gas emissions since the beginning of the industrial era. If we as a community work together to adapt and mitigate the effects, current and future generations will create a stronger local economy, take care of those that might be struggling, and create a more comfortable place to live.

This paper discusses the potential changes and impacts we may see in Milwaukie 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 (5.6°F) to avoid “severe, pervasive and irreversible impacts for people and ecosystems” (IPCC, 2014). Therefore, moving to a carbon neutral economy (no more greenhouse gases) and society will not be enough; we must go further to remove and sequester CO₂ that is already in our atmosphere.

How Will Milwaukie 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 Milwaukie and Willamette Valley area. These images outline some of those changes and impacts that principally focus on temperature, precipitation, more frequent storms, and wildfire events.

Heat




Summers are getting hotter and by 2100 temperatures could rise as much as 10-13 °F in the summer.

Impacts:

- Human health risk
- Physical activity and recreation
- Natural resources

Example: Increased temperatures and duration lead to greater rates of death in vulnerable populations and increased rates of violent crime

Flood, Drought & Winter Storms




Increased storm intensity leads to more flooding and landslide risk. Also precipitation will fall as rain rather than snow reducing water flows and supply.

Impacts:

- Landslide risk
- Ice storm frequency
- Drinking water supply
- Food insecurity
- Fish habitat
- Decreased hydro generation

Example: Greater variability in our weather patterns and more rain vs. snow will impact our everyday lives -- energy, economy, agriculture, and recreation

Wildfire



Wildfire is unlikely to be a direct threat to Milwaukie residents but fires in the region, similar to the summer fires in 2017 are anticipated to increase and impact residents.

Impacts:

- Air and water quality
- Property loss and displacement
- Occupational risk

Example: By 2080, median annual forest areas burned will be four times the median annual area of 1916-2007.



CITY OF MILWAUKIE Climate Action Plan

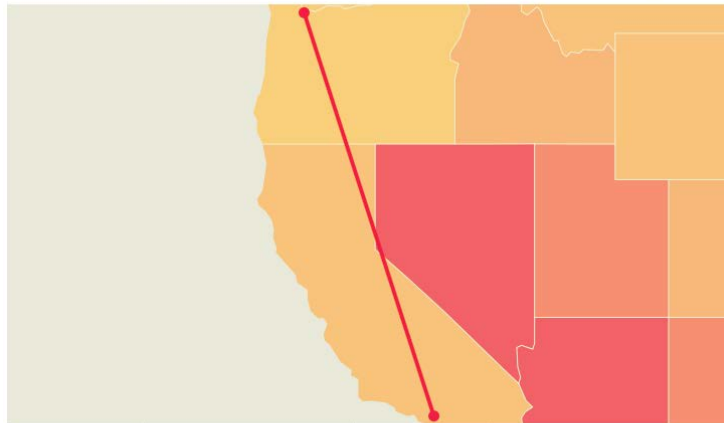
Milwaukie and Oregon will experience physical climate changes differently than other parts of the country. In many ways, our region is less vulnerable to more significant climate impacts than other parts of the U.S. and other countries. Without strong action, many parts of the world could become uninhabitable due to sea level rise, flooding, high temperatures, drought, or loss of drinking water supply and cascading effects to food

production. The desirability of our area could lead to significant climate refugee influxes as other areas become uninhabitable.

By 2100 in the Portland metro area, we can expect that our summer average temperature of 78°F to be more like Diamond Bar (San Diego), California at 88°F summer average (Climate Central, 2014).

In the past decade, we generally have experienced one day above 100°F annually, but by 2100 we can expect 22 days that are above 100°F (Climate Central, 2017).

I live in Portland, OR

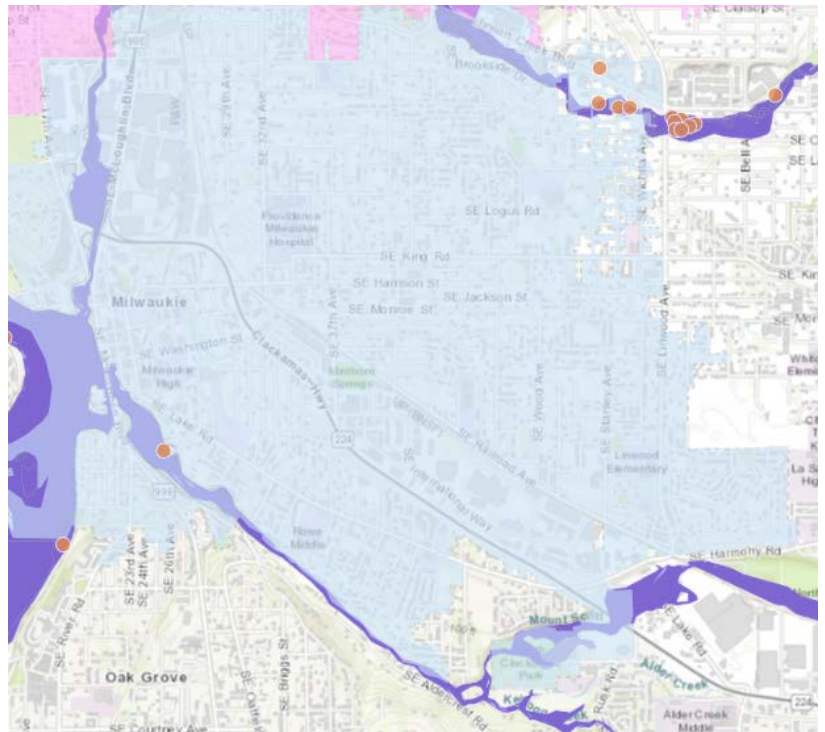


By 2100 summers in PORTLAND, OR 77.74 °F will be like summers now in DIAMOND BAR, CA 87.75 °F

CLIMATE CENTRAL

Past and Future Flood Risk

- In February 1996, three quarters of Clackamas County’s residents were affected by a flood and represented one third of all claims filed statewide for FEMA’s National Flood Insurance Program (NFIP).
- The Christmas Flood of 1964 and floods in 1861 and 1890 each exceeded 100-year flood marks.
- Milwaukie has experienced flooding in the past, and previously flooded sites are the most susceptible to flood again. Flood risk for Milwaukie is focused on areas where rivers and streams are adjacent to land.
- Site locations subject to flood risk are included Metro’s historical map of flooding in 1996 (see map). The dark and light purple shows flood risk and the orange dots signify the locations that flooded in 1996 including SE Johnson Creek Boulevard and the Island Station, Lake Road, and Linwood neighborhoods.



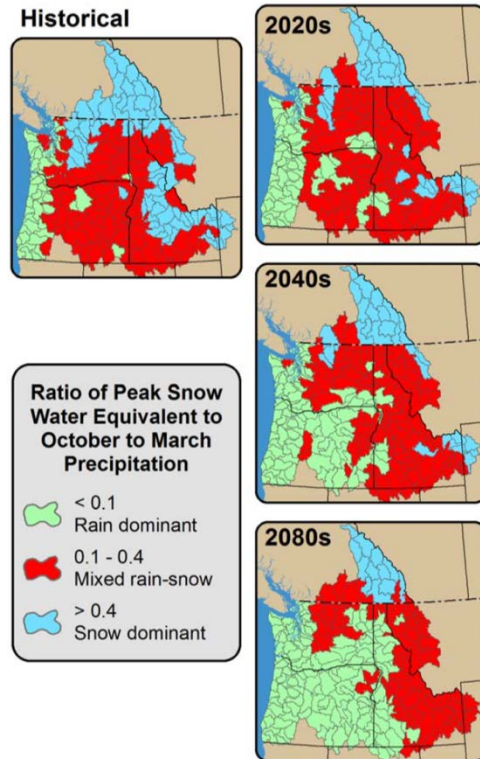


Water Source Risk

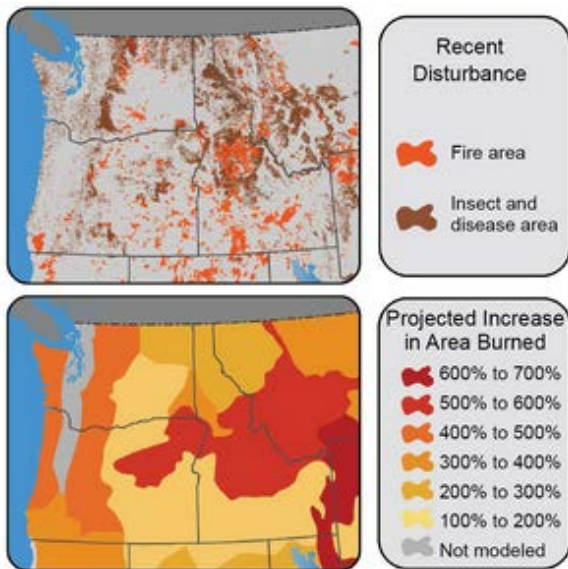
One of the most significant changes we are already experiencing is the shift in precipitation from snow to rainfall in the winter months. The graphic to the right shows the shift from the blue (snow dominant) and red (mixed rain-snow) in many areas to green (rain dominant) (Portland General Electric, 2016).¹

Milwaukie has been 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 drinking water supply, agricultural irrigation, habitat for fish species like salmon and trout, water supply to power hydroelectric electricity, and some of our favorite water recreations such as boating, fishing and rafting.

Ultimately, this water is the life source for us and nature and we will need to learn to become more resourceful in our collective use and reuse of this resource.



Regional Wildfire Risk



The Portland metro region is fairly safe from direct burning due to wildfires, although the urban wildland interface (cities 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 300% to 400% increase in the number of acres burned (Portland General Electric, 2016).

The main risk to Milwaukie residents will primarily be the air quality impacts that the city suffers as surrounding regions burn during the summer months. In the summer of 2017, the metro area suffered when

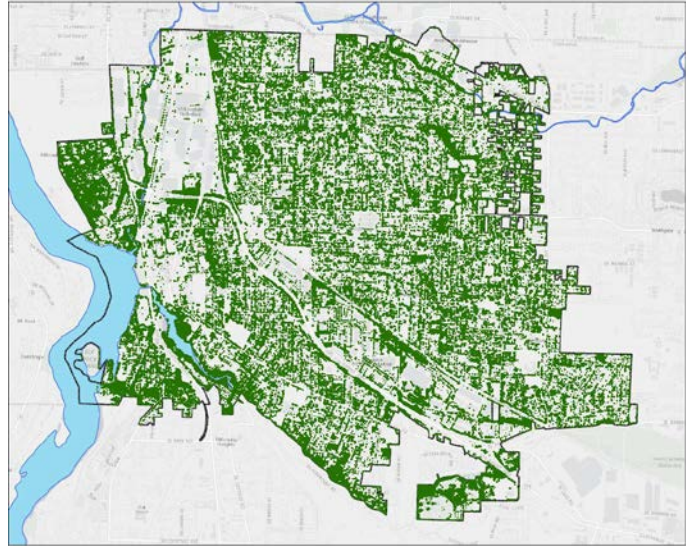
winds brought smoke from over 100 fires in British Columbia and then multiple Oregon and Washington fires, including the Eagle Creek Fire in the Columbia Gorge National Scenic Area.

¹ PGE commissioned OCCRI to assess climate change and its regional impacts on its customers and operations



One Example of How We Can Act – Planting Trees

- The City of Milwaukie can reduce the impacts of hotter temperatures (heat exhaustion) and higher incidences of flooding and landslides by planting more trees.
- The map to the right shows the existing urban forest. By planting trees in those areas that do not have tree canopy, the city can increase the capacity to provide shade and filter stormwater, thereby reducing climate impacts.
- The trees will need to survive both ice storms and drought/heat wave as they grow and eventually thrive under hotter conditions.



We Need Your Help

The challenge of climate change is great, but we have an opportunity act together early and ensure our community is prepared to preserve our health and happiness into the future. Coming together to create a Climate Action Plan is a powerful, crucial step in making sure Milwaukie remains a place to thrive. The Climate Action Plan will provide a realistic and meaningful roadmap of community-led actions help create the outcomes we all want.

Sources and Additional Resources

For further information and detail the following resources are helpful:

- Portland General Electric. 2016 Integrated Resource Plan. See: <https://www.portlandgeneral.com/our-company/energy-strategy/resource-planning/integrated-resource-planning>
- City of Milwaukie. 2014. Stormwater Master Plan. <https://www.milwaukieoregon.gov/publicworks/stormwater-master-plan>
- 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-summer-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 Health Authority. 2017. Oregon Climate and Health Resilience Plan. <https://apps.state.or.us/Forms/Served/1e8267a.pdf>
- U.S. Global Change Research Program. 2017. Fourth National Climate Assessment (NCA). See: https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf