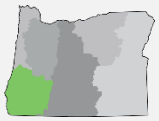

REGION 2

Observed & Projected Climate Changes

Air & Water Temperature

Observed	
Annual Air	• Temperatures in the region have increased since 1895, with mean annual temperature increasing between 0.05-0.13°C (0.09-0.23°F) per decade.
Seasonal Air	• Most warming has been observed in summer; spring had least warming.
Extreme Heat	• Increased number of extremely warm days (>90°F/32°C) in Medford since 1950. • Increased number of extremely warm nights (>65°F/18°C) in Medford the past two decades.
Streams	• Mean August temperatures for a small number of unregulated river sites with long-term records indicate a warming rate of 0.28°C (0.5°F) per decade from 1976-2015. • Historical trends indicate warming in summer and early fall months.
Projected by 2100	
Annual Air	• +2.4°C (4.3°F) to +5.6°C (10.1°F).
Seasonal Air	• Increased warming in all seasons, with the greatest amount of warming projected in summer (+5.2°C/9.4°F) and the least amount of warming in spring (+3.5°C/6.3°F). • Projected increases in winter temperatures would make the winter climate of Medford like that currently observed in Sacramento, CA. • Projected increases in summer mean maximum daily temperature - Medford: 32°C (89°F) in 2020s; 33.7°C (92°F) by 2050s. • Projected increases in winter mean maximum daily temperature - Medford 10.6°C (51°F) in 2020s; 11.7°C (53°F) by 2050s. • Increased growing season length.
Extreme Heat	• Longer, more frequent, and more intense heat waves. • Increase in the annual number of days >90°F (32°C) by mid-century (+6 to +26 days) compared to 1971-2000. ○ Medford: 43 days in 2020s; 65 days by 2050s. • Increased frequency and magnitude of days with extreme heat index (temperature + humidity).
Streams	• Outside of regulated reaches, stream temperature increases are relatively uniform except for smaller increases in streams at the highest elevations along the eastern and southern portions of the region. • +2.23°C (4°F) for mean August stream temperature. • River reaches on the Rogue and Applegate Rivers downstream of large dams and reservoirs projected to show minor temperature increases during summer months in comparison to free-flowing reaches.

Precipitation & Drought

Observed

Annual	• No significant long-term trend in annual precipitation. • Recent years (1987-2013) have been characterized by increased drought severity compared to 1960-1986. • North Bend received 12-15% less annual precipitation during the last 20 years.
Seasonal	• Minor increase in spring precipitation; some studies suggest declines in fall and summer precipitation.
Snowpack	• Declining April 1 snow-water equivalent (SWE) since 1950, although SNOTEL data for Rogue River-Siskiyou National Forest and Umpqua National Forest locations show no significant trend from 1981-2010.
Drought	• Increased drought severity in recent years (i.e., 1987-2013) compared to 1960-1986.

Projected by 2100

Annual	• Models generally project either no change in annual precipitation or a slight increase.
Seasonal	• Increase in winter precipitation (Dec-Feb) and less precipitation during growing season (Apr-Oct).
Extreme Precipitation	• Increased intensity of atmospheric rivers. • Increased number of days with an atmospheric river present.
Snowpack	• Substantial decline in mountain snowpack and an earlier snowmelt season. • Low-elevation western area: little change in snow residence time and April 1 SWE because snow is already mostly absent or ephemeral; higher ridges and peaks are likely to maintain some snow although it will be shallower and not last as long. • Transient or ephemeral snowpacks at mid-elevations in the Cascades will largely be eliminated and places with moderately persistent snowpacks will become more transient. • Average snow residence time projected to decrease 6-8 weeks in the High Cascades. • Annual mean snowfall in Jackson County: 3.81 in (97 mm) from 1981-2010; 2.08 in (53 mm) from 2025-2049.
Drought	• Increased frequency, severity, and duration of drought. • Annual number of dry days in Medford: 181 in 1990s, 188 by 2050. • Increased probability of more extreme droughts than those observed in the past century. • Climatic water deficit (a measure of drought stress) is projected to at least double; largest percentage increases are projected for areas above 2,100 m (6,890 ft). • Increased soil drought in the inland, southern portions of the region.

Hydrology & Sea Level Rise

Observed

Sea Level Rise & Storm Surge	• Relative sea level in southern Oregon (Coos Bay and south) is falling or slightly stable; relative sea level rise rates in central Oregon have been 1-3 mm (0.04-0.12 in)/year since at least the 1970s.
Streamflows	• Summer flows have been decreasing. • More of the annual flow has been occurring earlier in the water year.

Projected by 2100

Sea Level Rise & Storm Surge	• Rising sea level and increased storm surges. • Increased frequency of major and moderate high-tide flood events.

- Sea level at Port Orford projected to rise by 6-16 cm (2.4-6.3 in) by 2040 and 16-182 cm (6.3-71.7 in) by 2100.
- Sea level at Charleston projected to rise by 7-17 cm (2.8-6.7 in) by 2040 and 18-183 cm (7.1-72.0 in) by 2100.

Streamflows

- Overall, small increases in peak flow across the region, but large in those areas where snowpack changes are large (i.e., shifts from seasonal snowpacks to intermittent snowpacks in mid- to high-elevation Cascades).
- Slight increases in peak flows at the scale of small river basins in much of the western coastal mountains, although changes from seasonal to intermittent snowpacks along higher ridges may yield increased slope instability.
- Small decreases in low flows are expected over much of the region; the most notable declines in summer low flows are expected in the High Cascade streams, rivers to which they are a tributary (Rogue, Umpqua), and the northwestern Siskiyou Mountains.

Disturbances

Observed

Wildfire

- Between 1985-2010, annual area burned has increased only slightly in the Pacific Northwest; the proportion of fires that burned at high severity has not increased, with low- and moderate-severity fire making up most of the area burned.
- Over the past several decades, a number of large mixed-severity fires have occurred in southwest Oregon.

Projected by 2100

Wildfire

- Increased fire potential or area burned.
- Increased annual probability of very large fires/increased suitability for large wildfire.
- Increased fire frequency and area burned.
- Potential increase in fire severity.
- Increased number of high fire danger days in summer and fall (e.g., Medford: 12 days in 2020s, 16 days by 2050s).

Insects & Pathogens

- Greater pathogen damage in areas where tree vigor is diminished due to hotter, drier summers and associated drought stress.
- Flooding and other extreme events can exacerbate the spread of *Phytophthora lateralis*, a nonnative pathogen that causes root disease in Port Orford cedar.
- Expansion of non-native insect herbivores as well as native insects south of the region, with potential impacts on tree species.
- Warmer winters and increased droughts (longer or drier) may enable some insects to increase reproductive rates and move into previously unsuitable habitat.
- Increased tree mortality from insects and pathogens as trees are exposed to more stress associated with growing-season drought.

Invasive Plants

- Altered distribution and spread of non-native plant species.
- Many invasive species found in the region will likely proliferate following fire/other disturbances.

Information from the following references and the citations therein:

1. Halofsky, J.E., D.L. Peterson, and R.A. Gravenmier, eds. 2022. Climate change vulnerability and adaptation in southwest Oregon. Gen. Tech. Rep. PNW-GTR-995. U.S. Dept of Ag., Forest Service, Pacific Northwest Research Station. 445 p.

2. Halofsky, J.E., D.L. Peterson, and R.A. Gravenmier, eds. 2023. Climate change vulnerability and adaptation in Coastal Oregon. Gen. Tech. Rep. PNW-GTR-XXX. U.S. Dept of Ag., Forest Service, Pacific Northwest Research Station. XXX p.

3. Dalton, M. and E. Fleishman, eds. 2021. Fifth Oregon Climate Assessment. Oregon Climate Change Research Institute, Oregon State University. 183 p.

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