Climate Change Information for Oregon's County Natural Hazards Mitigation Plans

March 2018

In 2017, the Department of Land Conservation and Development (DLCD) contracted with the Oregon Climate Change Research Institute (OCCRI) to perform and provide analysis of the influence of climate change on natural hazards. The research includes county-specific data, graphics, and text for use in Natural Hazards Mitigation Plan (NHMP) updates for Wasco, Hood River, Harney, Lake, Malheur, Wheeler, Sherman, and Gilliam Counties.

This information sheet provides a brief overview of the qualitative and quantitative analysis that is being prepared, including example graphics. A full report, including written guidance on how to understand and use the data and graphics, will be provided by OCCRI to DLCD and the counties; there will be information applicable to all counties as well as the county-specific information. OCCRI and DLCD will also hold teleconferences and in-person meetings with county staff to present and discuss the results. The climate change information can and will be integrated into the NHMPs being updated, and can be used in other county plans, policies, and programs.

The basis of the research prepared by OCCRI uses future climate projections that are derived from 10–20 global climate models and have been "downscaled"—made locally relevant. Several climate metrics that relate to natural hazards (Table 1) are being calculated for historical and mid-21st century periods under two future emissions scenarios (Figure 1) that result in varying future temperature increases for the State of Oregon (Figure 2).

Table 1 Natural hazards and related climate metrics evaluated in this project.

Heavy Rains	Wettest Day ◆Wettest Five Days Landslide Threshold Exceedance
River Flooding	TBD
Drought	Summer Flow ◆ Spring Snow Summer Soil Moisture
Wildfire	Fire Danger Days
Heat Waves	Hottest Day ◆ Warmest Night # "Hot" Days ◆ # "Warm" Nights
Cold Waves	Coldest Day ◆ Coldest Night # "Cold" Days ◆ # "Cold" Nights
Air Quality	# Unhealthy Smoke Days
Windstorms ◆ Dust Storms Increased Invasive Species & Pests Loss of Wetland Ecosystems	

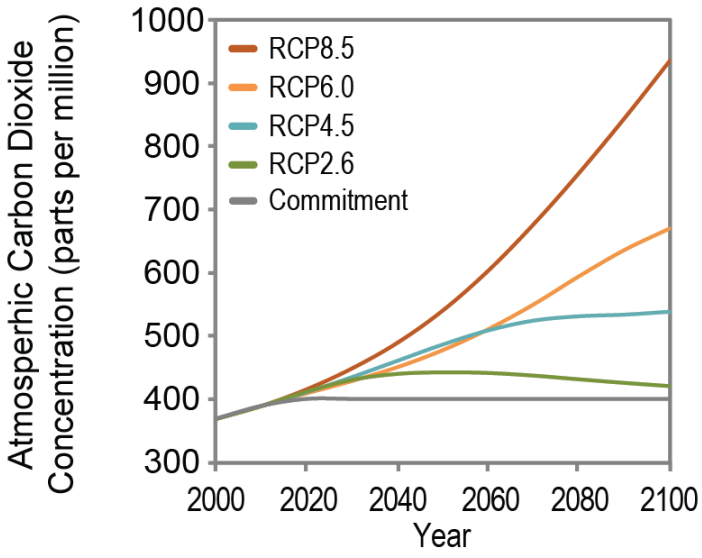


Figure 1 Future scenarios of atmospheric carbon dioxide concentrations resulting from emissions pathways, called Representative Concentration Pathways (RCPs), which are considered in the most recent National Climate Assessment. This project considers a lower emission pathway (RCP4.5) and a higher emissions pathway (RCP8.5) (Source: science2017.globalchange.gov).

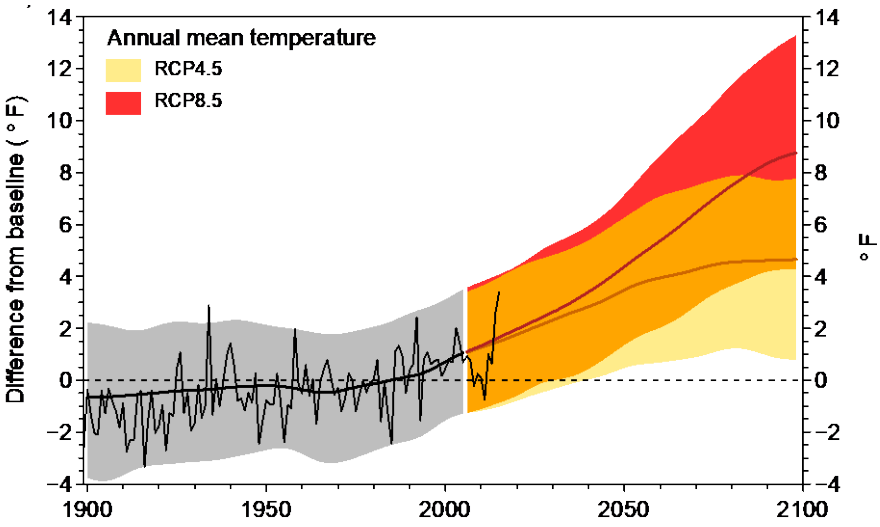


Figure 2 Projected changes in Oregon's mean annual temperature from the baseline 1970–1999 under a lower (RCP 4.5) and a higher (RCP 8.5) future emissions pathway. Thick lines and shading depict the mean and range of 35 global climate models, respectively. Thin black line shows observed temperature record for Oregon (Source: OCAR, 2017).

Figure 3 Fire danger days are defined as days in which a fire danger index exceeds the historical 90th percentile. (Left) The map shows the average change in annual fire danger days for each county. (Right) The bar plot shows the number of fire danger days in the average year in the historic period and future period for Wasco County. The error bars show the range of projections from 18 different climate models.

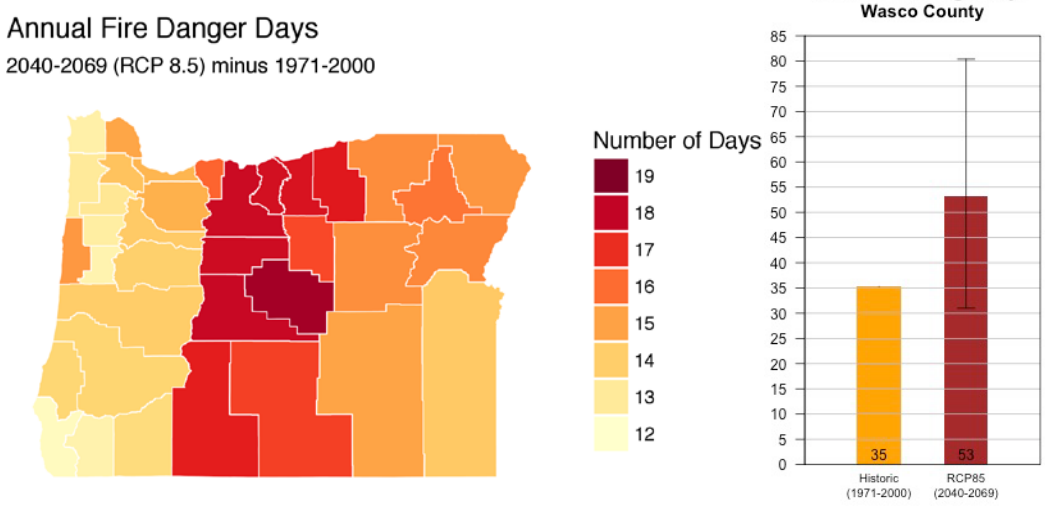
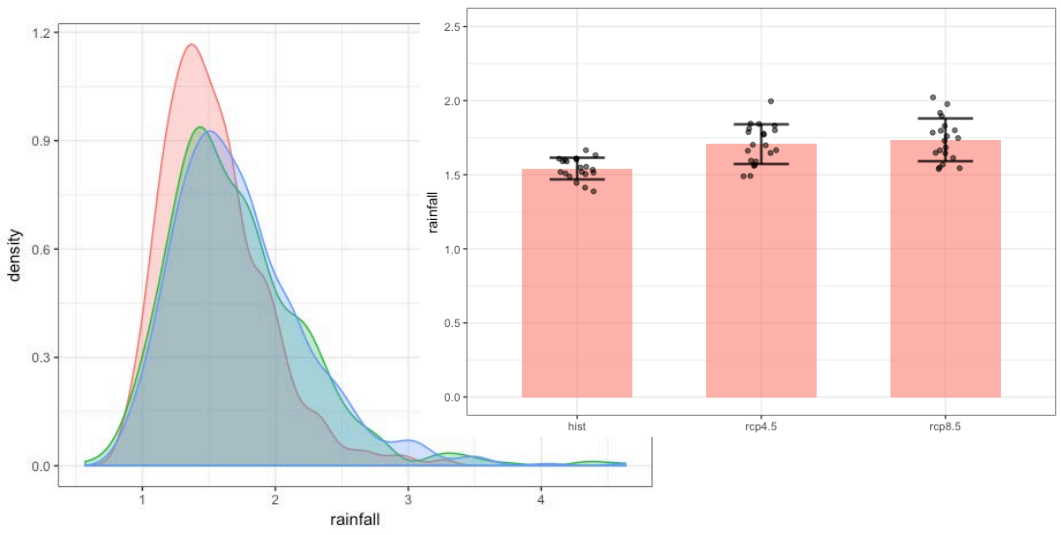


Figure 4 (Left) Probability of annual maximum 5-day rainfall during 1971–2000 (red) and 2040–2069 under a lower (green) and a higher (blue) future emissions pathway for Harney County. (Right) 30-year means and range for historic baseline and future scenarios.



These metrics, data, and graphics are meant to support your work. Comments and suggestions are welcome!

Contact: Meghan Dalton, mdalton@coas.oregonstate.edu, Oregon Climate Change Research Institute