

A future climate for a business-as-usual scenario

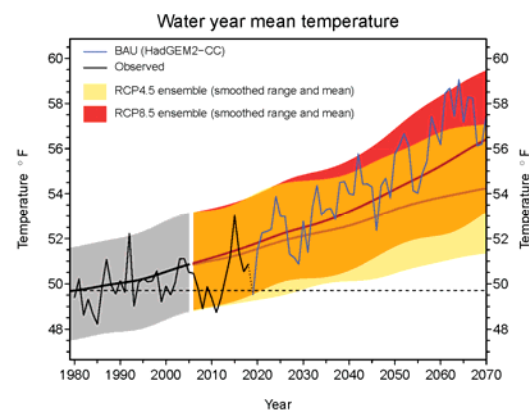
A business-as-usual (**BAU**) scenario assumes population growth follows current trajectories, and policies and resource management in the Willamette Valley continue in their current form.

There is really no “BAU” global greenhouse gas emissions scenario among the 4 **RCPs** used by the **IPCC**. While RCP8.5 could be labeled as BAU in that it assumes weak mitigation efforts consistent with current mitigation trends, its assumptions about global population growth, energy intensity, and geopolitical fragmentation are considered pessimistic. Still, because we are currently closer to RCP8.5 than the next highest scenario (RCP6.0) in terms of global CO₂ emissions, RCP8.5 may be closer to BAU than the other RCPs at least for the next several decades.

From an existing set of 20 climate projections per RCP, we propose one from the **HadGEM2-CC** climate model with RCP8.5 for our BAU scenario. This projection is one of those being used by the **RMJOC** in their reservoir operations assessment. HadGEM2-CC scores highly in model performance evaluations.

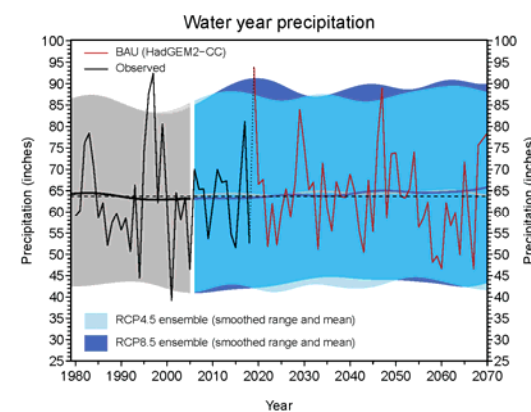
RCP: Representative Concentration Pathway. An RCP describes a future trajectory of concentrations of greenhouse gases, aerosols, and other pollutants.
IPCC: Intergovernmental Panel on Climate Change. The IPCC is the United Nations body for assessing the science of climate change.
HadGEM2-CC: Hadley Global Environmental Model 2 – Carbon Cycle.
RMJOC: River Management Joint Operating Committee. The RMJOC, comprised of the Bonneville Power Administration, U.S. Army Corps of Engineers, and Bureau of Reclamation, is tasked with evaluating and anticipating vulnerabilities, risk, and resiliency of the Federal Columbia River Power System

Willamette Basin



Projected temperature

HadGEM2-CC simulates basin-average annual mean temperatures of as much as 9°F above the historical average by the 2060s. In the 20th century, annual temperatures were rarely 2°F above average.



Projected precipitation

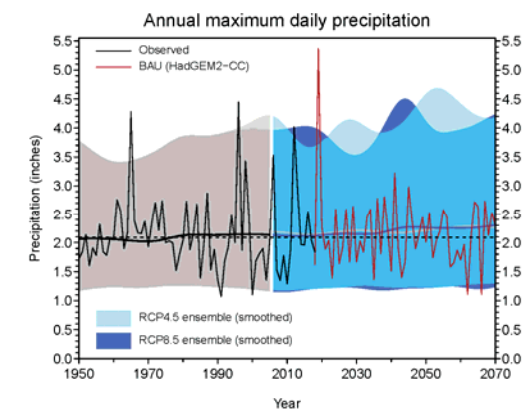
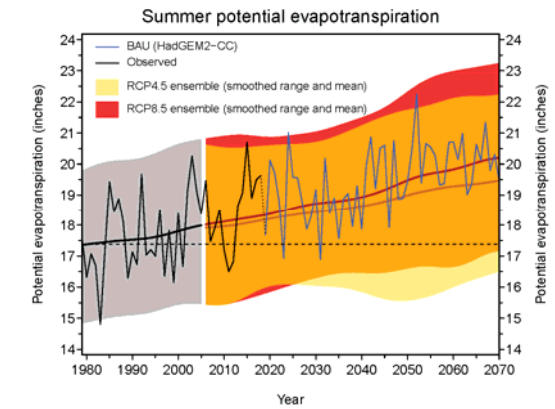
HadGEM2-CC simulates little change in the long-term average water year precipitation, but between 2010 and 2070 includes years with both extremely high and low precipitation and a multi-year drought.

Willametteville*

*a.k.a., Corvallis, OR

Agricultural water demand

How will increasing potential evaporation and CO₂ fertilization affect agricultural water use?

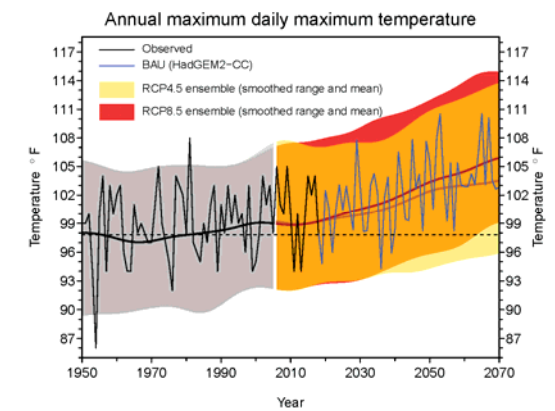


Intense rainfall

How will intense rainfall events stress water management systems?

Extreme heat

How will more frequent extreme heat episodes adversely effect terrestrial and aquatic biological systems?



Sunlight for photovoltaics

Will increasing solar radiation in summer offset efficiency losses from increasing temperature?

