

Climate Change In the Whole Columbia Basin

*CRT Discussion Session
October 3, 2023 R. MacDonald and G. Utzig*




Purpose

- Illustrate the projected streamflow changes for the whole Columbia Basin
- Highlight the differences between the projections for the Canadian Columbia Basin and the whole Basin

CRTPM Dashboard

CRTPM Dashboard is an interactive application that allows the user to analyse and compare runs/scenarios generated from the CRT Oasis systems model. The application allows the user to explore the CRT reservoirs on an interactive map, produce plots of hydrographs and performance measures, build an integrated performance measure, and view data tables.

Select Dashboard tab to view Performance Measures




The map shows the Columbia River Basin, including the NECHAMO PLATEAU and FRASER PLATEAU. Major cities like Vancouver, Seattle, and Portland are marked. Reservoir locations are highlighted in red and orange along the river.




Climate and Hydrology Datasets for RMJOC Long-Term Planning Studies: Second Edition (RMJOC-II)

Part II: Columbia River Reservoir Regulation and Operations—Modeling and Analyses

August, 2020



The image shows an aerial view of a large dam structure on a river, surrounded by a valley and some buildings.

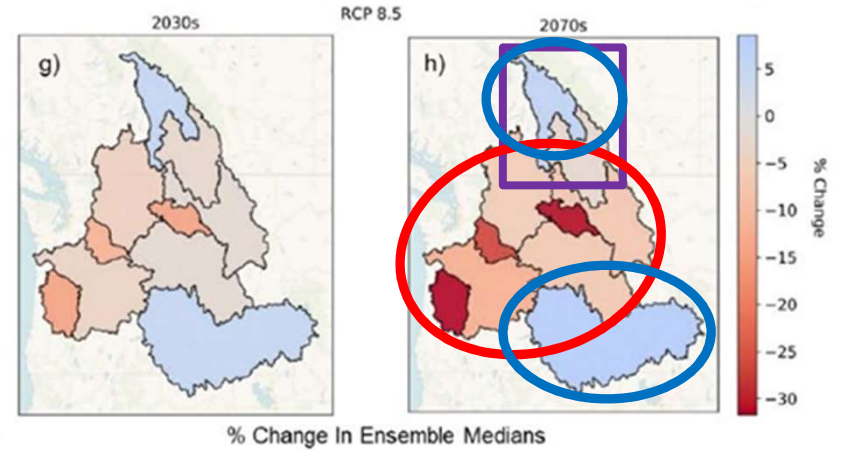
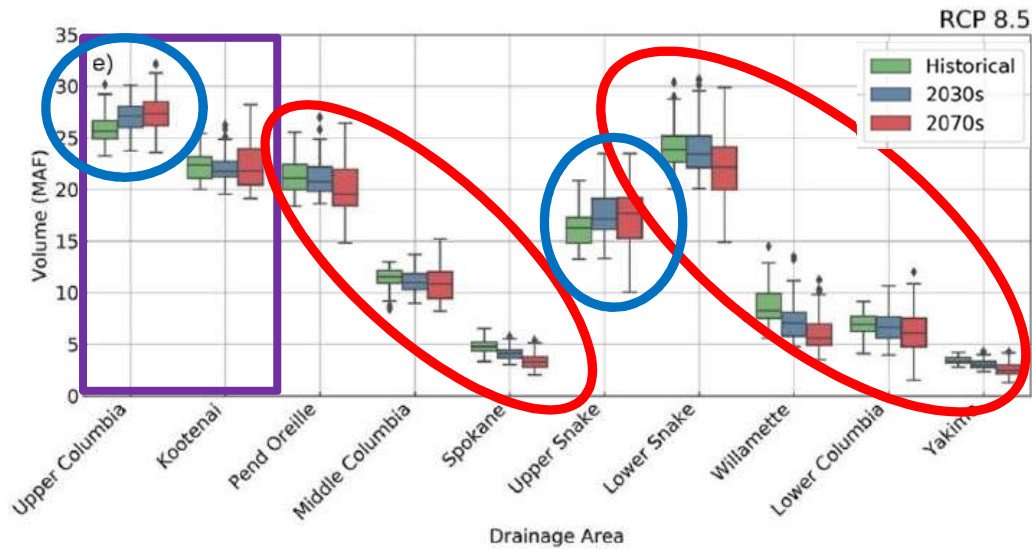
River Management Joint Operating Committee (RMJOC)
Bonneville Power Administration, United States Army Corps of Engineers,
United States Bureau of Reclamation

10 Sub-basins

The Dalles, Oregon
—
System flow site for FRM

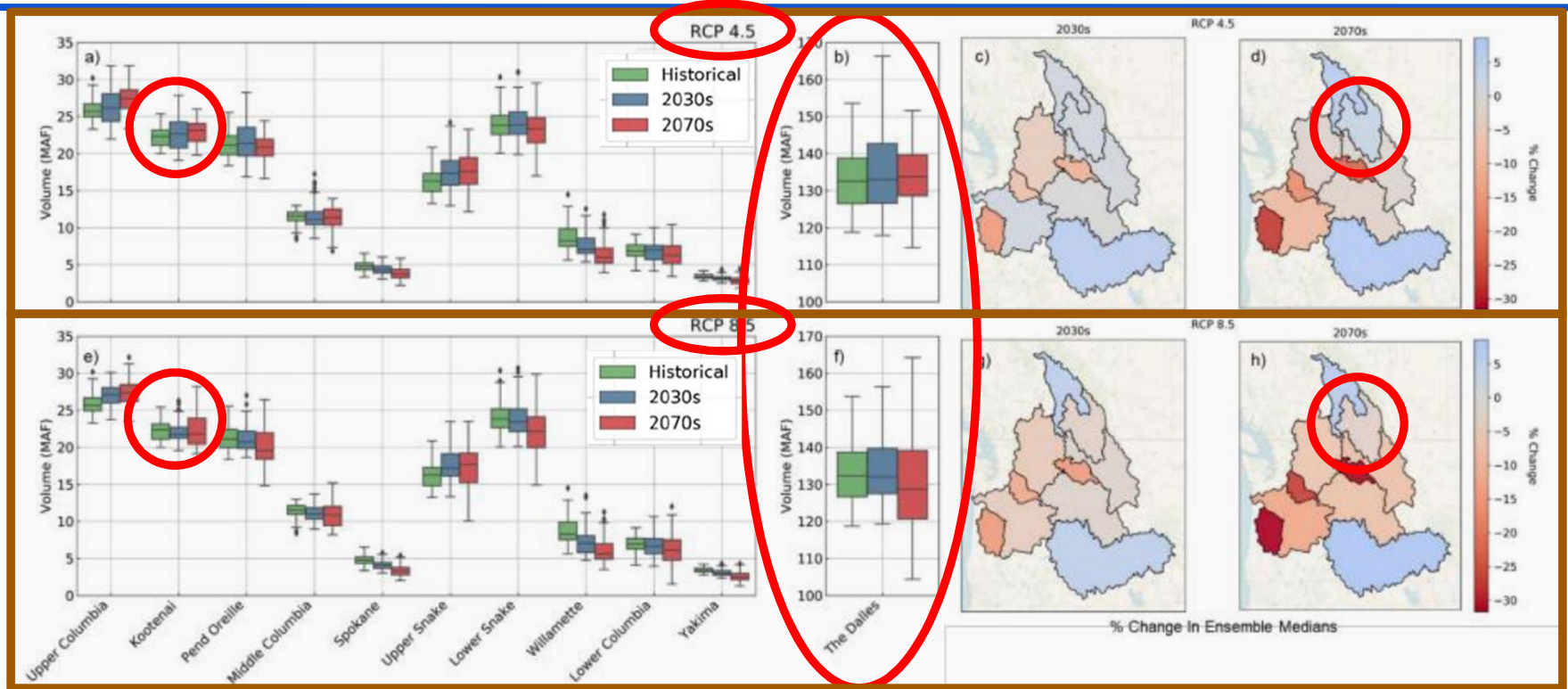


Large Spring Flood Events* (April to August)- unregulated (RMJOC)



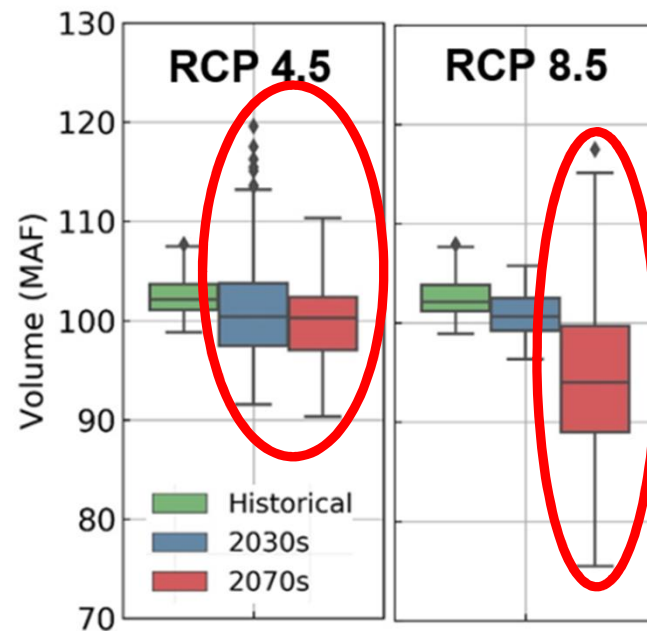
* Based on 5 largest events in each period – median of CGM ensemble

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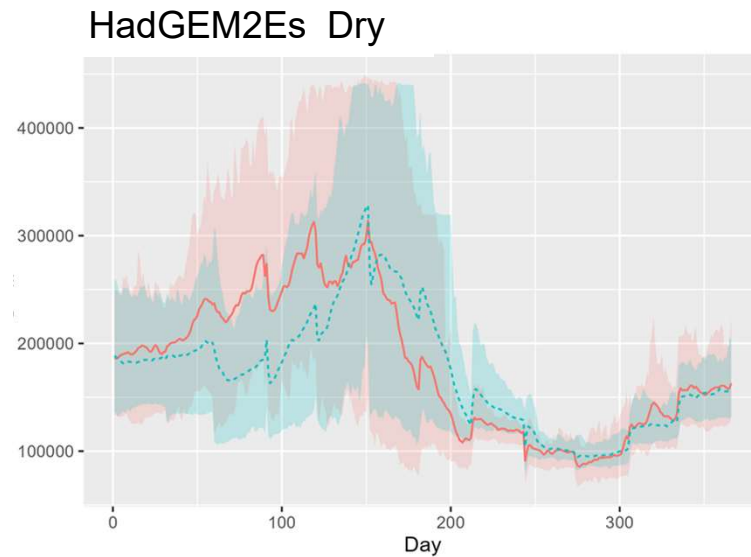
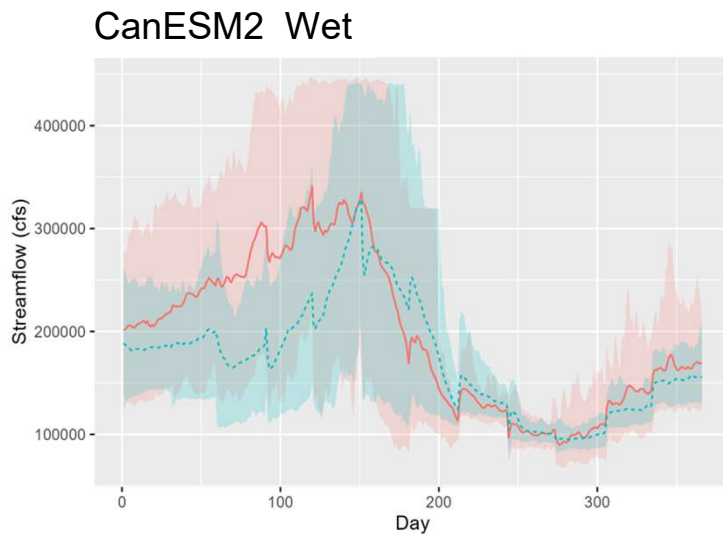
April–August: Runoff Volume (RMJOC)



Modeled historical and future mean April–August runoff volume of the Columbia River at The Dalles, Oregon.

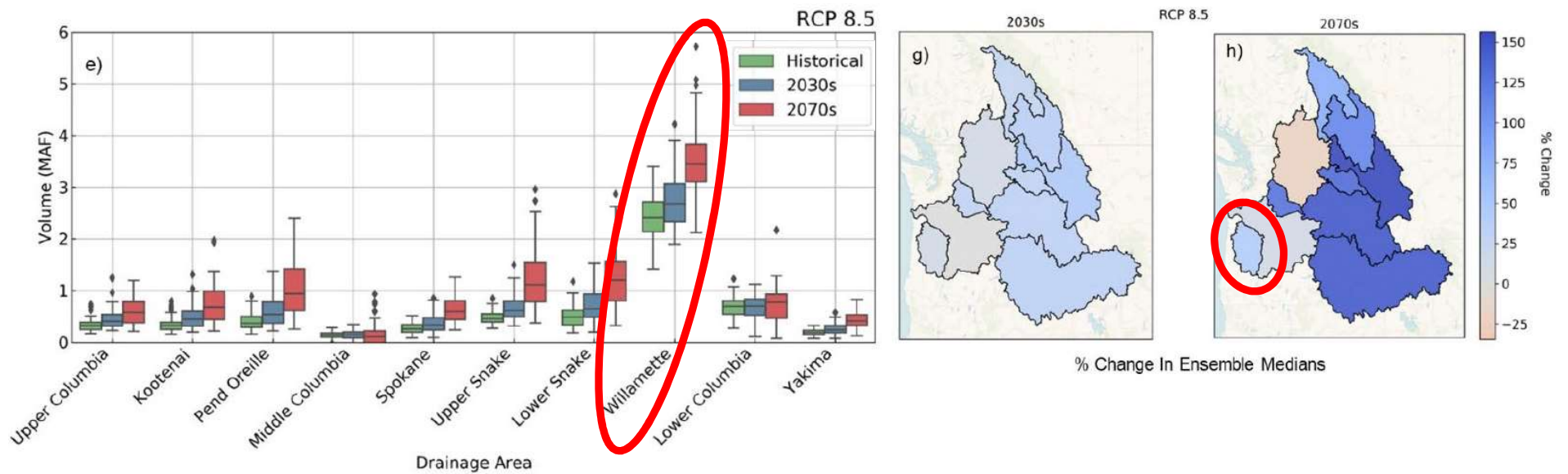
Dalles streamflow – regulated – CRT-PM

Dalles flooding threshold set at 450 kcfs



Historical (green-dashed) = 1928 to 2008
Climate change (orange-solid) = 2010 to 2070

Large Winter Floods* – unregulated (RMJOC)



* Based on 5 largest events on the Columbia at the Willamette confluence in each period – median of CGM ensemble (volume is total of 10 days preceding the peak event)

Whole Basin CC Take Aways

- Climate change impacts on streamflows in the US are different from BC
- There is significant uncertainty about the frequency and magnitude of spring flooding at the Dalles - it could go up or down
- Risk of extreme events – floods and droughts – are increasing
- Winter floods in the Lower Columbia/Willamette are possible, with potential for calls for BC to store water to off-set flooding in Portland
- Flood predictions at the Dalles may no longer be well correlated with flood risks in BC or Portland