Stochastic Generation of Water Supply Scenarios by a Weather Generator with Perturbed Weather Properties

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Introduction

"We can spend megabucks on climate research ... and still not answer the questions"
Vit Klemes, 2002

Anthropogenic Climate Change (ACC) has questioned our assumptions about the probability of future hydrological events. Nowadays, climate models are key tools to provide better understanding on how the future climate conditions will unfold. However, they may not be quite useful in assisting decision-makers to select the most robust water management designs due to their:

- Coarse spatial resolution
- Stationarity assumptions in downscaling techniques
- Inability to reproduce variabilities

To select the most robust management designs, decision makers are nowadays more interested in using bottom-up decision-making approaches. In these approaches, the first step is to have a complete understanding of total system vulnerabilities. To analyze system vulnerabilities, a wide variety of future climate scenarios is needed to capture all our assumptions about plausible changes in climate.

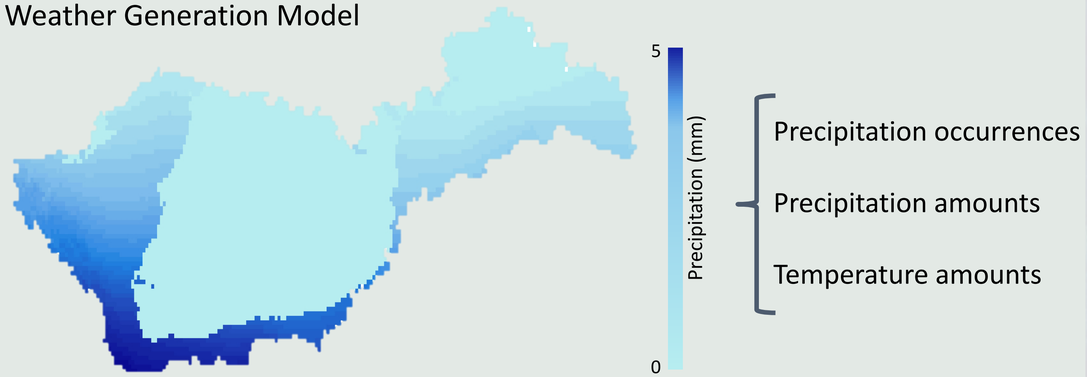
Objectives

We are interested in:

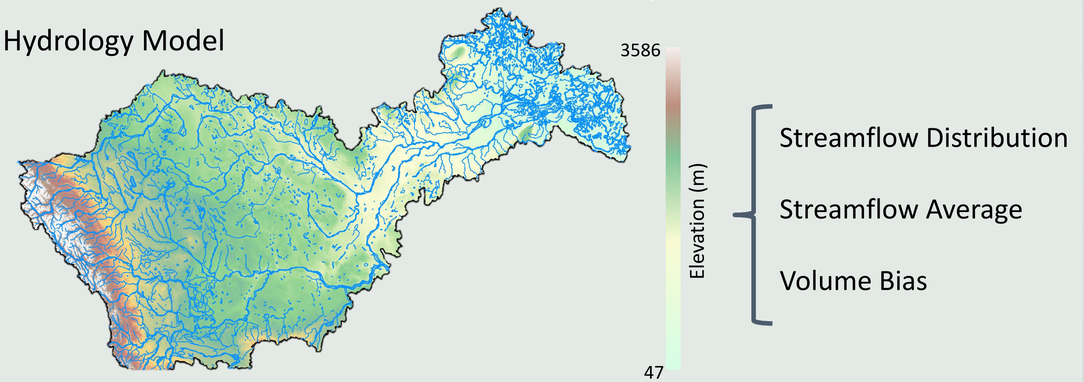
- analyzing vulnerabilities of the current water resources system in the Saskatchewan River Basin
- examining vulnerabilities of the current transboundary water agreements in a changing climate

Multi-site Stochastic Weather Generator and Climate Stress-test

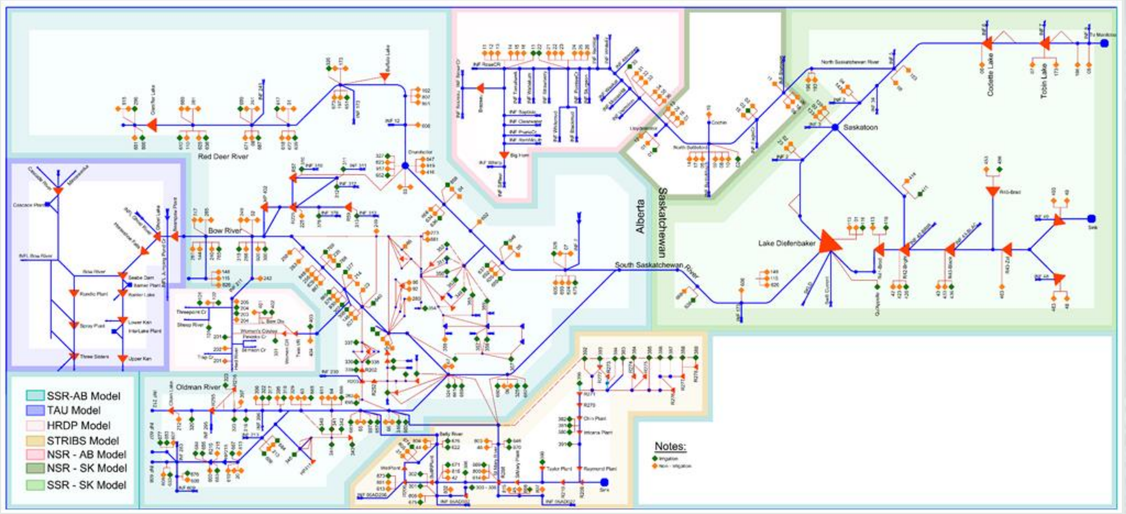
1. Weather Generation Model



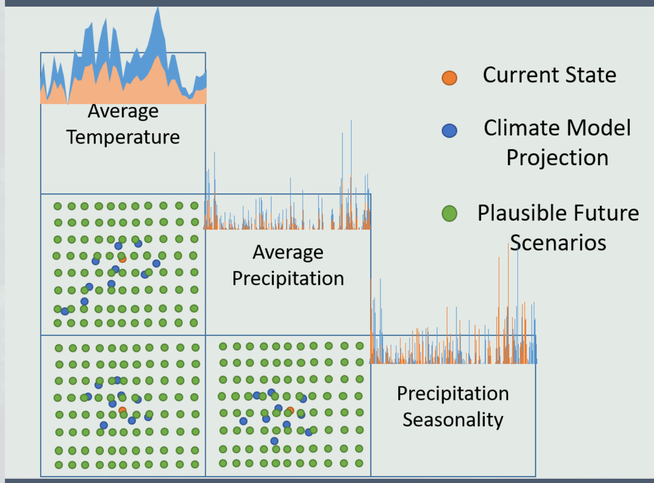
2. Hydrology Model



3. Water Management Model



Climate Exposure Space



State of the Research and Future Work

- The weather generator and hydrology models have been set up for the Rocky Mountains area.
- The water management model has been set up using the MODSIM program for most parts of the basin.
- This basin-wide vulnerability analysis approach will be used to select the most robust water management designs which are less sensitive to future climate change.

References

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