



WATER For The SEASONS

Sustaining Water Resources in a Changing Climate

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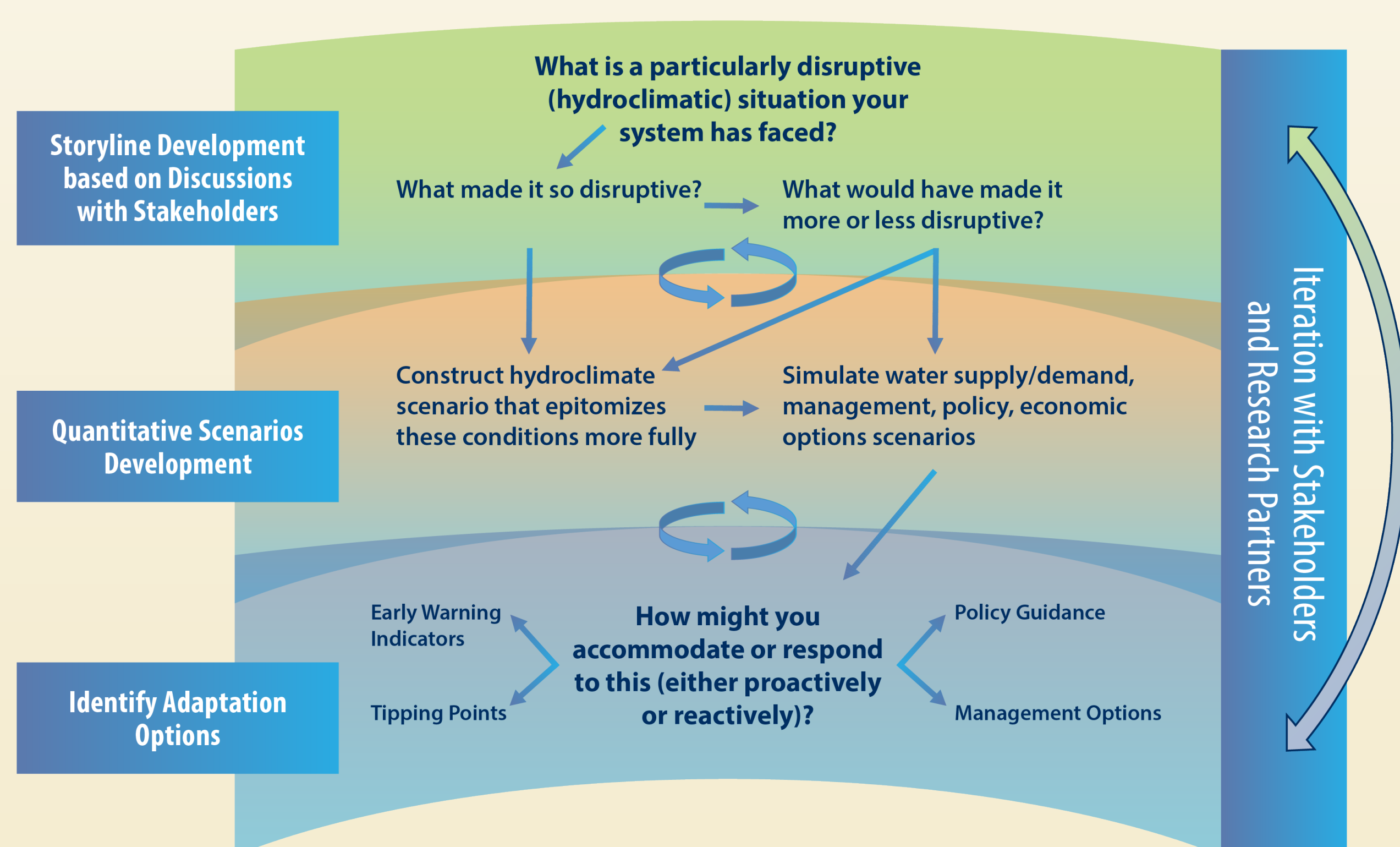
Collaborative Specification of Climate Extreme Stress-Test Scenarios from Climate-Projection Ensembles

What is a Stress Test?

Stress tests are a form of scenario planning that focus specifically on disruptive events and their effects on the system or population of interest as opposed to focusing on a wider range of more likely events or potential futures.

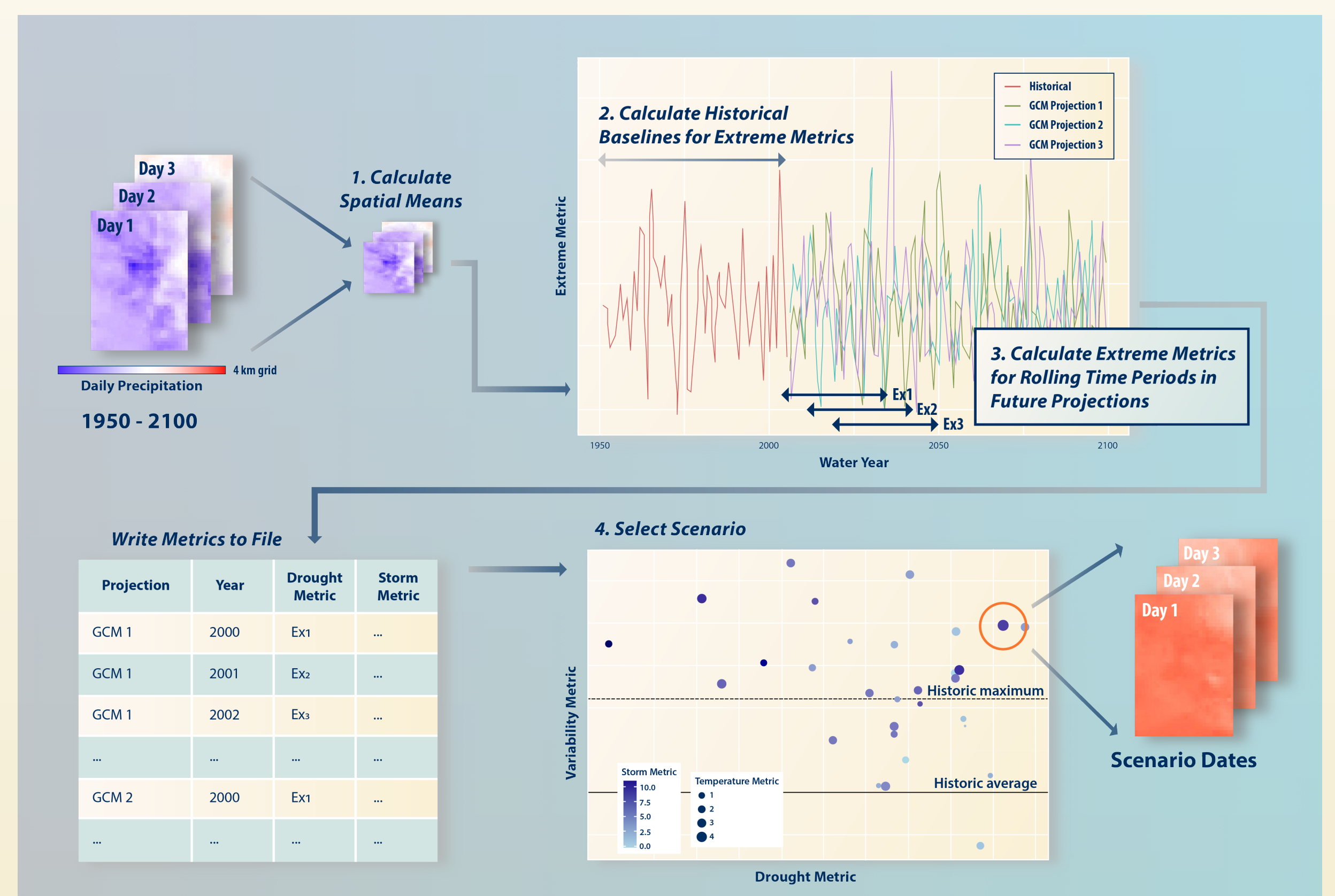
The Hydroclimate Extreme Stress-Test Scenario Development Process

- The iterative process of developing climate stress-test scenarios begins with a discussion with stakeholders about what hydroclimatic disruptions they are most concerned about.
- Next, a qualitative description of the scenario is developed and it is translated into a quantitative scenario (see right panel).



- The quantitative hydroclimate scenario is then fed into one or more impact simulations and results are visualized and presented to stakeholders to identify potential adaptation strategies.
- This process is iterative on multiple counts, as researchers and stakeholders hone in on the quantitative depiction of the hydroclimatic conditions for the scenario, tweak management or other options to explore the consequences of potential interventions, and repeat the cycle with a diversity of other stress-test scenarios.

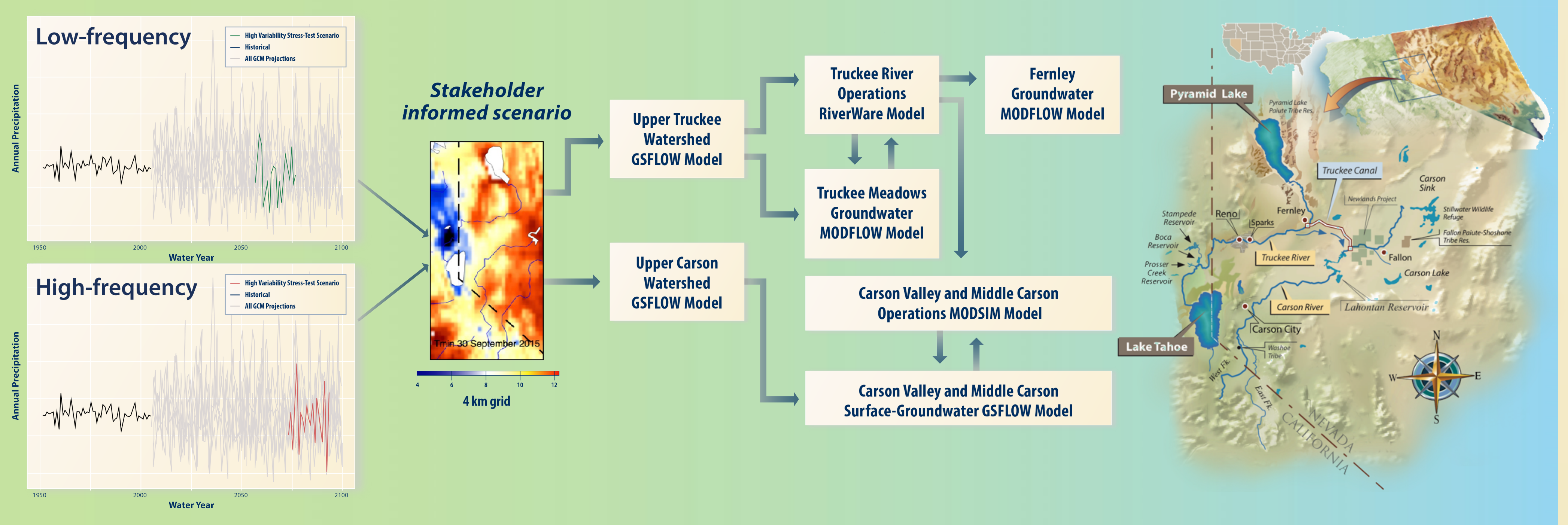
Mining the Global Climate Model Projections for Hydroclimate Stress-Test Scenarios



- Calculate a spatial mean for each climate variable and day for the region of interest.
- Calculate a historical baseline for the extreme metric of interest (e.g., 10-year return interval for 3-day storm or heat wave events).
- Calculate extreme metrics over rolling time periods for all available future climate projections.
- Filter climate extreme metrics to identify the scenario. In the simple case described here, one could identify for each projection, the top few driest 20-year periods, and plot each of these against the number of extreme storms, temperature, precipitation variability, or any other metric of interest during those same periods to identify the 20-year period that best fits with the stress test needs of the stakeholders.

High Precipitation Variability Stress-Test Scenarios for the Truckee-Carson System

The process and workflow described above were used to identify two scenarios representing low- and high-frequency precipitation variability. Hydrologic simulations (right) based on these scenarios will help to inform adaptation strategies in the Truckee-Carson system.



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