

## **Regional Water Planning Under Conditions of Future Uncertainty**

A method of scenario based planning is used to explore the resilience of water management strategies across plausible ranges of uncertainty in key driving variables (e.g., climate, population, conservation levels, etc.). The research began with a goal for Integrated Resource Planning (IRP) at a time when the natural, regulatory, and economic factors driving water supply were all in flux. In fact, the concept of ‘uncertainty’ in modeling changed dramatically in the timeframe of this project.

In the past, standard methods assumed that historic hydrologic cycles would repeat themselves and that population and economic sector growth increased year to year on linear basis. Under these assumptions, water management alternatives could be designed to store and move water where it was needed.

However, as we have all seen in the past year, there may be considerable uncertainty in demographic demand projections. Further, there is considerable uncertainty in the assumption that past hydrologic patterns can be used to predict the timing and magnitude of future flows. Changes in both demand and supply side variables result in the possibility of a range of future flow volumes and annual time series. How do we develop a sustainable plan in face of this magnitude of uncertainty?

Collaboration with the Stockholm Environment Institute (SEI-US) and the National Center for Atmospheric Research (NCAR) resulted in a tool that links multi-criteria decision analysis (MCDA) and the SEI-US Water Evaluation and Planning (WEAP) model in a framework that supports rapid climate, population, and conservation scenario analysis. The result is a desktop tool allowing water managers to explore the resiliency and robustness of regional water strategies and capital improvement investments under a range of uncertain future conditions.

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