

Developing Information for the Integration of Climate Change in Long–Term Water Supply Planning

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Most water utilities plan strategically to ensure that expected future demands can be met adequately with their water supply even during extreme climate events. Traditionally, this has been done under the assumption that the variability in streamflow (i.e., water availability) in the future will resemble the patterns observed historically. However as climate warming intensifies the global hydrological cycle, relying on past observations and experiences alone is no longer sufficient for long–term planning and management. As a result, water resource managers are increasingly seeking relevant and credible information about future climate change.

Researchers at Carolinas Integrated Sciences and Assessments (CISA) are collaborating with representatives from a public water utility in North Carolina and their engineering consulting firm to assess the implications of climate change for long–range planning. Specifically, we are focusing on the potential changes in reliability of the utility’s raw water supply over the next fifty years.

This analysis – informed by a bottom–up approach known as ‘Decision Scaling’ – began with modeling of the water supply system’s sensitivity to climate and characterizing the changes in climate that threaten the system’s ability to perform within pre–defined thresholds of acceptable performance. The resulting understanding of ‘critical climate changes’ is then used to tailor the information available from climate change projections to assess the plausibility of these changes occurring over the utility’s planning horizon. The uncertainty in these projections will be characterized in terms of relative likelihoods of exceeding or not–exceeding system performance thresholds that are consequential for strategic planning.

By focusing on the system’s vulnerability to climate, this type of decision–centric analysis is likely to address limitations of GCM–driven impact assessments in informing water resource decision making. This presentation will begin with a brief overview from the utility manager about their climate change–related information needs and questions. Then, CISA researchers will highlight the unique aspects of the analytical approach and present the tailored information produced about changes in the reliability of the utility’s water supply. The discussion will also include how these findings might be integrated in the current long–range planning process.