Jonathan D. Herman, Patrick M. Reed, Ph.D., Harrison B. Zeff, and Gregory W. Characklis, 2015, How should robustness be defined for water systems planning under change? *Journal of Water Resources Planning and Management,* vol. 141, issue 10.

Abstract Water systems planners have long recognized the need for robust solutions capable of withstanding deviations from the conditions for which they were designed. Robustness analyses have shifted from expected utility to exploratory bottom-up approaches which identify vulnerable scenarios prior to assigning likelihoods. Examples include Robust Decision Making (RDM), Decision Scaling, Info-Gap, and Many-Objective Robust Decision Making (MORDM). We propose a taxonomy of robustness frameworks to compare and contrast these approaches based on their methods of (1) alternative generation, (2) sampling of states of the world, (3) quantification of robustness measures, and (4) sensitivity analysis to identify important uncertainties. Building from the proposed taxonomy, we use a regional urban water supply case study in the Research Triangle region of North Carolina to illustrate the decision-relevant consequences that emerge from each of these choices. Results indicate that the methodological choices in the taxonomy lead to the selection of substantially different planning alternatives, underscoring the importance of an informed definition of robustness. Moreover, the results show that some commonly employed methodological choices and definitions of robustness can have undesired consequences when ranking decision alternatives. For the demonstrated test case, recommendations for overcoming these issues include: (1) decision alternatives should be searched rather than prespecified, (2) dominant uncertainties should be discovered through sensitivity analysis rather than assumed, and (3) a carefully elicited multivariate satisficing measure of robustness allows stakeholders to achieve their problem-specific performance requirements. This work emphasizes the importance of an informed problem formulation for systems facing challenging performance tradeoffs and provides a common vocabulary to link the robustness frameworks widely used in the field of water systems planning .