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The Social Process of Analyzing Real Water Resource Systems Plans and Management Policies

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Developing and applying systems analysis methods for improving the development and management of real world water resource systems, I have learned, is primarily a social process. This talk is a call for more recognition of this reality in the modeling approaches we propose in the papers and books we publish.
The mathematical models designed to inform planners and managers of water systems that we see in many of our journals often seem more complex than they need be. They also often seem not as connected to reality as they could be. While it may be easier to publish descriptions of complex models than simpler ones, and while adding complexity to models might make them better able to mimic or resemble the actual complexity of the real physical and/or social systems or processes being analyzed, the usefulness of such models often can be an illusion. Sometimes the important features of reality that are of concern or interest to those who make decisions can be adequately captured using relatively simple models. Finding the right balance for the particular issues being addressed or the particular decisions that need to be made is an art. When applied to real world problems or issues in specific basins or regions, systems modeling projects often involve more attention to the social aspects than the mathematical ones.
Mathematical models addressing connected interacting interdependent components of complex water systems are in fact some of the most useful methods we have to study and better understand the systems we manage around us. They can help us identify and evaluate possible alternative solutions to problems facing humanity today. The study of real world systems of interacting components using mathematical models is commonly called applied systems analyses. Performing such analyses with decision makers rather than of decision makers is critical if the needed trust between project personnel and their clients is to be developed. Using examples from recent and ongoing modeling projects in different parts of the world, this talk will attempt to show the dependency on the degree of project success with the degree of attention given to the communication between project personnel, the stakeholders and decision making institutions. It will also highlight how initial project terms-of-reference and expected outcomes can change, sometimes in surprising ways, during the course of such projects. Changing project objectives often result from changing stakeholder values, emphasizing the need for analyses that can adapt to this uncertainty.