

Hydrologic Analysis and Simulation of the Colorado River System

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Abstract. The water supply provided by the Colorado River system is critical to millions of residents in the arid West of the United States. Understanding the response of the system to possible hydrologic occurrences is important to water planners and managers for short, medium, and long term planning and operation of the system. There is a long sequence of historical streamflow records available, however, this sequence is still not sufficient to capture the complex temporal and spatial variability of the river system. The overall objective of the study is to determine the effect of alternative possible future hydrologic scenarios on water supply availability throughout the entire river system. Another objective is to estimate the sustainable yield of the Upper Colorado River basin. The hydrologic scenarios will be derived from the 98-year historical streamflow record and the 513-year tree-ring derived streamflow record. Synthetic streamflows will be determined based on stochastic models and modeling strategies using the software SAMS developed at Colorado State University. In addition, streamflow scenarios will be derived using the index sequential method. The response of the system to different streamflow scenarios will be evaluated using the Bureau of Reclamation's Colorado River Simulation System (CRSS) model implemented in RiverWare software, a river basin modeling program developed by CADSWES. The model outputs will be used/analyzed to determine the occurrence probabilities of critical river system conditions (e.g. reservoir levels and reservoir outflows) within a specified planning horizon. The various results obtained up to the present will be discussed.