Potential Community Water and Cost Savings Resulting from Reuse and Conservation Practices as Predicted by an Integrated Urban Water Model

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Abstract. Water conservation and reuse practices are becoming necessary as communities struggle with growing populations, increasing demands, and decreasing supplies. Here, an Integrated Urban Water Model is applied to data from two urban communities to evaluate the water savings and economic benefits of several water conservation and reuse practices. The model is capable of analyzing these practices separately or simultaneously and is based on basic volumetric flow balances from an integrative systems approach to urban water management. Several viable alternatives exist for urban water conservation. However, it is often difficult to determine which of these may be the most beneficial to a community. Several water management scenarios were modeled for each community. The reuse and conservation practices modeled include general conservation, reclaimed wastewater reuse, graywater reuse, and roof runoff capture. Considerable water and cost savings totaling millions of dollars per year could be realized under the most comprehensive conservation and reuse scenario. The results are highly dependent on utility rates and whether reuse practices can meet demand. For roof runoff capture, storage capacity and climate limits this ability. From a total water management perspective, promoting all conservation practices offers the most benefit. However, the feasibility of implementing such an intensive water management program is questionable. Because of excess infrastructure costs, legality issues, and the efficiency associated with some of the conservation practices, encouraging graywater reuse and general conservation as an alternative may prove to be the most cost effective approach to better manage the limited water resources of a community.