

Abstract:

Development and application of decision-support tools for water resources decisionmakers have focused on simulation models, due to the complexity of representing a multi-objective reservoir system optimization problem. Nevertheless, selection of optimum or nearly optimum water resources allocation and the cost associated with it is a critical and vital decision for reservoir managers. A complex system, composed of three dams, two pumping stations and a diversion structure all serving an agricultural production unit, is presented in this paper. The objective of this study is to determine the capacity of the diversion structure and a nearly optimum water allocation / pumping policy based on a “trade-off” between minimizing the water overall deficiency and the cost of pumping, without having to formulate the problem as a constrained optimization one. To achieve this objective, a water resources model was developed using HEC-5 Reservoir System Simulation program. Several release policies were simulated and compared using an objective function that incorporates the cost of pumping, when necessary, and a measure of the water shortage due to any decrease in the system reliability. The selected water allocation policy reduces the total of the pumping costs to its half with a slight reduction in the water allocation reliability.