World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:12, No:06, 2018

Investigating the Behavior of Water Shortage Indices for Performance Evaluation of a Water Resources System

Authors : Frederick N. F. Chou, Nguyen Thi Thuy Linh

Abstract : The impact of water shortages has been increasingly severe as a consequence of population growth, urbanization, economic development, and climate change. The need for improvements in reliable water supply systems is urgent with the increasing living standards of regions. In this study, a suitable shortage index capable of multi-aspect description - frequency, magnitude, and duration - is adopted to more accurately describe the characteristics of a shortage situation. The values of the index were determined to cope with the increasing need for reliability. There are four reservoirs in series located on the Be River of the Dong Nai River Basin in Southern Vietnam. The primary purpose of the three upstream reservoirs is hydropower generation while the primary purpose of the fourth is water supply. A compromise between hydropower generation and water supply can be negotiated for these four reservoirs to reduce the severity of water shortages. A generalized water allocation model was applied to simulate the water supply, and hydropower generation of various management alternatives and the system's reliability was evaluated using the adopted multiple shortage indices. Modifying management policies of water resources using data-based indexes can improve the reliability of water supply.

Keywords : cascade reservoirs, hydropower, shortage index, water supply
Conference Title : ICEWW 2018 : International Conference on Environment, Water and Wetlands
Conference Location : Toronto, Canada
Conference Dates : June 21-22, 2018