Analysis of Reservoir Water Quality Using Fuzzy Synthetic Evaluation

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Abstract

A general methodology for fuzzy synthetic evaluation is developed and illustrated with a case study of trophic status assessment for Fei-Tsui Reservoir in Taiwan. The historical data base was collected from the management agency of Fei-Tsui Reservoir from 1987 to 1996. In fuzzy synthetic evaluation, the classification is determined by a matrix operation of the weighted vector with the fuzzy evaluation matrix. After all individual membership functions of evaluated factors have been determined, the fuzzy evaluation matrix can be established. The weighted vector is determined by the analytic hierarchy process method (AHP). The results of this investigation show that the long-term change of water quality and the overturn phenomena cannot be observed with the Carlson index from 1987 to 1992 but is expressed by fuzzy synthetic evaluation. Fuzzy synthetic evaluation is better suited than the Carlson index to rating the trophic status of self-sustaining lakes. Interpretation of the results can provide valuable information to decision makers and aid reservoir management.