Title

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Journal

Journal of Irrigation and Drainage Engineering, 142(7)

ISSN

0733-9437

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Publication Date

2016-07-01

DOI

10.1061/(asce)ir.1943-4774.0001055

Peer reviewed

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DOI: 10.1061/(ASCE)IR.1943-4774.0000865

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Simulation and optimization models have been widely used in various fields of hydrosystems analysis, such as reservoir operation (Ashofteh et al. 2013, 2015a), levee layouts and design (Bozorg-Haddad et al. 2015), design operation of pumped-storage and hydropower systems (Bozorg-Haddad et al. 2014), and algorithmic developments (Shokri et al. 2013). However, only a few of these studies have considered the management of reservoirs exposed to the sudden entry of biological pollutants.

The authors thank the discusser for his comments regarding the original paper. The discusser's comments were presented in six paragraphs, to which these authors' corresponding responses are as follows.

The discusser stated that the maximum value of released water would be better handled based on the maximum volume of downstream demand. As identified in the reservoir mass balance equation and clarified in other publications (Bozorg-Haddad et al. 2008, 2014; Ashofteh et al. 2015b), water released from reservoirs should be based on the availability of stored water. The maximum released water is determined from the base period and not from the maximum demand. This is so because it may be that downstream demand exceeds the availability of stored water in the reservoir, and thus, in this instance, it is not possible to release water from the reservoir based on demand (as proposed by the discusser) because of insufficient storage.

The discusser stated that it is better to use a normal probability distribution function for releases. Five series of release data sets were generated based on uniform probability distribution function in the interval of 0 to 60 m^3/s in the paper being discussed. This was done to investigate the sensitivity of released pollution to released water from the reservoir.

Concerning the value of the maximum release from the reservoir (i.e., 60 m^3/s) during operating and selecting five series of random numbers based on the uniform probability distribution function (with domain from 0 to 60 m^3/s), an appropriate range of release was chosen (i.e., 12, 24, 36, 48, and 60 m^3/s). In addition, results in the original paper indicate that there is no relation between water release and released pollution concentration. Therefore, the selection of the normal probability distribution function would not improve results and increase the computational burden.

The discusser stated that the impact of the other affected parameters on thermal stratification should be considered. It is known that many factors contribute to thermal stratification, such as geographical location (temperature changes, windiness, cloudiness, and solar radiation) and depth of the reservoir inflows to and outflows from the reservoir. All these factors are necessary to investigate the thermal stratification's behavior of different reservoirs located in various environments over time. Therefore, it was not possible to consider all the parameters cited by the discusser because the original paper addressed the thermal stratification of the Karaj dam (with specified geographical location) exclusively.

The discusser stated that it is better to use three-dimensional (3D) models to capture the cross-sectional effects. Choosing a model with appropriate simulation dimensionality for forecasting reservoir response to a sudden pollution event is important. The CE-QUAL-W2 model is a two-dimensional model that investigates changes along the reservoir's length (in the horizontal direction) and changes in reservoir depth (in the vertical direction) (Amirkhani et al. 2015). If the river is long, such as the Karaj reservoir, it is preferable to use a model with resolution in the longitudinal direction for simulation purposes (and not resolution in the transversal direction). Using 3D models in this case would only complicate the problem and increase the computational burden without improving the accuracy of the results.

The year 2006 was selected as the base year in the original paper because in this year, hydrometric and meteorological data as well as water-quality tests were available. The original paper did not state that the climatic parameters in that year were similar to those of long-term average patterns (contrary to what was stated in the discussion). Meanwhile, the figure presented in the original paper compared the flow patterns of the base-year and the long-term average (and not climatic parameters).

The discusser stated that evaporation can be considered as another scenario for simulation of reservoir quantitative phenomena. Various scenarios were evaluated in the original paper to evaluate pollution processes. These scenarios were expressed in terms of management strategy, reservoir operation, and pollutant properties. Therefore, in the original paper, the aim was not to consider the conditions governing the regional climate (such as evaporation).

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