

Review of Mathematical Surface Water's Hydrodynamic/Water Quality Models with Their Application on the Shatt Al Arab River Southern Iraq

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ABSTRACT

The hydrodynamic/water quality model is an important tool in water environment management. It is used to gain a deeper understanding of physical, chemical, and biological processes and to develop models capable to represent surface waters with realism. A hydrodynamic model can give essential data to sediment, noxious, and eutrophication modelling. Models enable decision-makers to select alternatives for water quality management that are superior and more scientifically justifiable. They also provide a basis for economic analysis to evaluate environmental significance and cost-benefit ratio. The presented study reviewed a variety of research that used various techniques for surface water modeling. The first section focused on the studies conducted on the Shatt Al Arab River and its branches in Basrah province southern Iraq. The second section included studies conducted on various local and global applied cases. As for the third section, it reviewed the studies that used the method of linking models to produce a more effective system, which is the approach we recommend using it in building a comprehensive model of the Shatt al-Arab river. The model will connect the HEC-RAS software, which is known for its competence in modeling complex two-dimensional situations, with the WASP program, which has a high ability to represent a wide range of water pollutants that HEC-RAS cannot represent, especially in a two-dimensional model.

1. Introduction

The hydrodynamic/water quality model has become an indispensable analysis instrument in water environment management, and the water model's derivation and application have become a popular topic in environmental engineering (Liu et al., 2021). The two primary reasons to conduct modeling are (1) to better understand the physical, chemical, and biological processes and (2) to develop models capable of realistically representing surface waters, so that the models can be used to support water quality management and decision-making. The river water quality model combines effect of its hydrodynamic characteristics and natural reaction

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