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ENHANCING THE SELF-PURIFICATION PROCESS IN TWO LATERAL BRANCHES OF SHATT AL-ARAB RIVER

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Abstract

Shatt Al-Arab River, which is a tidal stream located in Basrah Governorate, South of Iraq, is characterized by its many lateral branches such as Al-Robat and Al Jubyla creeks. The water of these creeks is polluted due to raw sewage discharge. The aim of this study is to enhance the creeks self-purification (SP) capacity, measured in terms of SP factor. The enhancement was made by modifying the study area geometry to obtain the highest SP factor values. That was accomplished by simulating sixty-two unsteady flow cases of the study area (one case for the present geometry and sixty-one cases for the modified geometry) using HEC-RAS software. The SP factor of Al-Robat and Al-Jubyla creeks was found to be mostly less than unity for the present geometry. Thus, the rate of deoxygenation dominates that of reaeration and the dissolved oxygen may reach a critical value that cannot preserve the aquatic life. Whereas, for the modified geometry cases, the SP factor values varied according to the implemented geometry modification. The study results revealed that the SP factor of the study area can be increased to be greater than unity and subsequently the SP process in the study area can be enhanced by adopting the modified geometry RIB10-a. Where for RIB-10a; the study area is proposed to have a constant width of 20 m with a bottom slope of 0.0001 and the water surface level at Al-Robat creek end would be controlled by a regulator.

Key words: deoxygenation coefficient, HEC-RAS software, reaeration coefficient, self-purification factor, stream geometry modification

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