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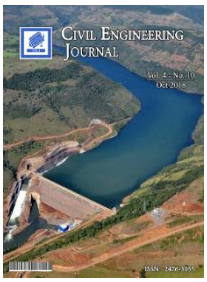

Developing Water Quality Index to Assess the Quality of the Drinking Water

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Abstract

In the present study, an attempt has been to develop a new water quality index (WQI) method that depends on the Iraqi specifications for drinking water (IQS 417, 2009) to assess the validity of the Euphrates River for drinking by classifying the quality of the river water at different stations along its entire reach inside the Iraqi lands. The proposed classifications by this method are: Excellent, Good, Acceptable, Poor, and Very poor. Eight water quality parameters have been selected to represent the quality of the river water these are: Ion Hydrogen Concentration (pH), Calcium (Ca), Magnesium (Mg), Sodium (Na), Chloride (Cl), Sulphate (SO_4), Nitrate (NO_3), and Total Dissolved Solids (TDS). The variation of the water quality parameters along the river have been represented by graphs using Excel.2013 software. The results revealed that the quality of the Euphrates River ranges from "Good" to "Poor", it enters the Iraqi borders with "Good" water quality and gradually its quality begins to decrease after it receives pollution from many sources such as domestic sewage and different industrial effluents until its quality becomes "Poor" according to the proposed classification. Finally the proposed WQI can be used as a tool to assess the quality of the river with both place and time.

Keywords: Drinking Water Quality Index; Surface Water; Iraqi Specifications for Drinking Water; Euphrates River.

1. Introduction

Freshwater sources in the form of rivers are considered a fundamental for the wellbeing of a hale and healthy society. Unfortunately, during the last decades these natural resources were being tainted in the sake of the development and flood hazard mitigation [1]. Water scarcity is increasing worldwide and the pressure on the existing water resources is being increased continuously due to the growing demand by the several sectors such as, domestic, agricultural, industrial, hydropower generation, etc.. Surface water pollution was and will be a major problem worldwide, caused by both natural processes and anthropogenic activities [1]. The surface water quality in a region can be affected by both point and nonpoint sources of pollution [2]. Point source pollution comes from a single known source such as effluents from industries and wastewater treatment plants [3], whereas nonpoint sources may be runoff associated with a particular land use such as urban (e.g., storm water, sewage overflows), agriculture (e.g., fertilizers, pesticides, animal manure) [4]. Entry of these sources into water can represent the discharge of toxic chemicals and pathogenic microorganisms; therefore, water quality monitoring and sanitary risk identification are essential to protect the population from waterborne diseases and to develop appropriate evaluation of surface water quality especially in drinking water sources [5, 6]. Thus, identifying the sources of contamination and developing appropriate management strategies is essential for minimizing potential public health risks. The assessment of water quality in various countries has become a critical research topic in the last few years [5]. Many water quality assessment models have been used to assess the quality of

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