

## **Assessment of Water Quality Indices for Shatt Al-Basrah River in Basrah City, Iraq**

**Dr. Hussein H. Karim**

Building and Construction Engineering Department, University of Technology, Baghdad.

Email: husn\_irq@yahoo.com

**Dr. Abdul Razzak T. Ziboon**

Building and Construction Engineering Department, University of Technology, Baghdad.

Email: razzak1956@yahoo.com

**Luay M. Al-Hemidawi**

Building and Construction Engineering Department, University of Technology, Baghdad.

Email: luay.muzahim@yahoo.com

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### **ABSTRACT**

Oil projects in the province of Basrah are widely spread and remarkably increasing as they are considered to be of a significant impact on the environment of this region in elements of air, water and soil. This is due to the presence of toxic elements in the air as a result of fuel, or waste thrown into the water. So, this research addresses to study the amount of the pollutants concentration that are discharged by Shuaiba refinery which is located in Basrah province and works for about 24 hours daily. To assess the impact of the refinery on the river, 36 water samples were collected for six months period (from December, 2014 - May, 2015) as well as field measurements and laboratory analyses in order to get appropriate solutions and proposals as much as possible. 180 field measurements have been achieved include electrical conductivity (EC), total dissolved solids (TDS), turbidity, water temperature, and hydrogen ion concentration (pH). In addition, 342 water samples have been prepared to measure several physical and chemical characteristics ( $\text{NH}_3$ ,  $\text{NH}_4$ ,  $\text{NO}_2$ ,  $\text{NO}_3$ ,  $\text{SO}_4$ , Cl and Ca, oil and grease, and total hardness TH) inside and outside Shuaiba refinery in the study area. Measurements of these pollutant concentrations were carried out on six sampling sites; one inside the wastewater collection tanks of the refinery and the remained five sites along the Shatt Al-Basrah River.

The locations of these sites were selected according to the land use map of Landsat 8 data 2015 and the coordinates of each sample location was measured precisely by GPS. The analysis, pollutants concentration maps and their locations on the satellite image were carried out using Arc GIS 10.3 and ERDAS 2013 software. The field and laboratory test results of water samples indicated high pollutants concentrations during December, April and May months, while there were a decreased pollutants concentration particularly during the month of March. It is noticed the high reflectivity values in areas that contain contaminants (turbidity) or oily spots with a purity of more sites. The calculations of water quality index (WQI) for all the study sites are within the range of 11.79 to 21.31. Accordingly, the overall WQI class of the study sites in Shatt Al- Basrah River can be

emphasized within "poor category" in the polluted range according to studied types of water pollution. The deterioration of the Shatt Al-Basrah water quality is observed toward south of Basrah city due to the pollutants flow into the river.

**Keywords:** Pollutants; Water; Water Quality Index (WQI); Shatt Al- Basrah; GIS and GPS