

# Assessment of Water Quality of Shatt Al-Basrah Canal using Water Pollution Index

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## Abstract

This study evaluates the water quality for the Canal of Shatt Al-Basrah, located in Basrah province, Iraq. The Shatt Al-Basrah Canal used to connect the waterway from Al-Hammar marshes in the north of Basrah province, to Khor Al-Zubair port in the south of the province. Nine physicochemical water quality parameters have been measured and analyzed for calculating the water pollution index (WPI) in the Canal. These parameters, which were used in developing the WPI, included: Potential of Hydrogen (pH), Nitrate ( $\text{NO}_3^-$ ), Calcium ( $\text{Ca}^{2+}$ ), Total Alkalinity (TA.), Electrical Conductivity (EC), Sodium ( $\text{Na}^+$ ), Total Dissolved Solids (TDS), Sulfate ( $\text{SO}_4^{2-}$ ), Phosphate ( $\text{PO}_4^{3-}$ ), Dissolved Oxygen (DO), Total Hardness (TH), Chloride ( $\text{Cl}^-$ ), Magnesium ( $\text{Mg}^{2+}$ ), and Potassium ( $\text{K}^+$ ). The aim of this paper is to analyze and assess the water pollution of the Shatt Al-Basrah Canal in the year 2014, making use of the WPI method. The annual WPI mean value during the study period was more than the safe value; therefore, the water quality of the Canal ranged from impure (type V) to the heavily impure (type VI) and hence definitely regarded as unsuitable for drinking uses. Consequently, there is a need that is immediate to take some measures to stop the pollution and enhance the water quality of the Canals a component that is integral to the environment in Basrah province. In Basrah province, the disposal of wastewater in the Shatt Al-Basrah Canal is big maintenance difficulty of the Canal water quality.

**Keywords:** Pollution index, Water quality, Physico-chemical parameters, Shatt Al-Basrah, Water Canal, Iraq.

## 1. Introduction

The quality of surface water decided by some natural processes, such as precipitation, soil erosion, and atmospheric conditions. The other non-natural processes, which influence the surface water quality related to human activities such as urbanization, industrial and agricultural activities, as well as the demand on the exploitation of water resources (Carpenter et al. 1998; Jarvie et al. 1998). The term water quality used to characterize the physicochemical properties of water, commonly with regard to its suitability for a purpose that is particular.

Water is necessary for sustaining the full life on the planet. Therefore, people must increase the good water supplied to communities satisfactorily. Nonetheless, the safety of water is the important issue need to be assess. Since supplying reliable water and ingesting that is safe is an important problem, evaluation of drinking water quality is necessary in order to guarantee safe water to supply it to the community. Therefore, specific and vital parameters of water quality are required to be monitored so that it is easy to determine its evaluation.

Modern society is contributing, through its commercial, agricultural activities, not just to change global environmental trends, but also, more straight, to local degradation that is environmental. The management of water resource is an issue that is universal, especially affects populations surviving in areas where extreme agricultural and industrial activities occurred, as this could impact the quality and quantity of surface water/groundwater. Monitoring is an actual means of regular testing of certain quality parameters figured out international as

well as national based guidelines and limitations. Consequently, the monitoring process and compared the results with the standards, is a tool that is important to decide, whether or not drinking water is safe.

The problem of pollution for surface water happens to be listed among the many problems that tend to be severe in developing countries. In the developing world, a lot of rivers in the urban areas are the endpoint of effluents that discharged from some local industries. The main effects on public health reduce agriculture production, and water resources degradations are the wastewater discharges from industrial plants and urban runoff.

The assessment criteria associated with the surface water status using the physicochemical quality factors reasonably reveal existing pollution of the surface water. Extensive assessment of pollution has to assess a more substantial number of pollutants such as the microbiological contaminants as well as water. When any water quality parameter surpasses the restrict values of the desired ideal condition, the ecosystem strategy demonstrably suggests the require to take monitoring that is continuous, so as to prevent the pollution.

Following the event of severe drought experienced in the last years, it was decided to assess waters of the Canal of Shatt Al-Basrah as an alternative source of water supply for the city of Basrah. An attention that is special must be provided with to the assessment of the Shatt Al-Basrah water quality and contamination problems, as their intended purpose that the Canal is one of the most effective artificial water resources in Basrah.

As an important to know the water resources quality, this paper aims to determine and assess the pollution in the Shatt Al-Basrah Canal by calculating a water pollution index (WPI) based on different physicochemical parameters of water quality. The