AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERIN
IRRIGATION &HYDRAULICS DEPARTMENT

Surface Water Quality Management
Case Study: Rosetta Branch-River Nile

A Thesis Submitted in Partial Fulfillment for the Requirements
of the PhD Degree of Science in Civil Engineering
(Irrigation and Hydraulics)
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STATEMENT

This thesis is submitted to the Irrigation and Hydraulics Department, Faculty of Engineering, Ain Shams University in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Civil Engineering

The work included in this thesis was carried out by the author in the Irrigation and Hydraulics Department, Faculty of Engineering, Ain Shams University from 2007 to 2012.

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ABSTRACT

Water in sufficient quantity and of adequate quality is necessary for the well-being of all living organisms. Poor water quality can render available supplies unsuitable for its intended uses. Thus, water quality, if not adequately managed, can serve as a serious limiting factor to the future economic development and to the public health. This in turn could lead to irreversible damage to the quantity and quality of available water resources. Thus, the need for better management of the quality of water resources is greatly recognized. Water quality management involves the identification and assessment of point and non-point source pollutants and their sources, and then determining the best management practices to control those pollutants to meet water quality standards.

Rosetta Branch is the main source of water for many cities and industrial zones in the northern part of Egypt. This branch is subjected to different sources of pollution, such as agricultural drains and industrial waste water from industrial zones. This study mainly aims to develop a user friendly Geographic Information Systems (GIS) model using visual basic for application (VBA) in ArcGIS environment. The developed model was used to assess and control the pollution, as well as the pollution sources were identified and mitigation measures

were provided. The work tasks can be divided into three parts. First a database for the Rosetta branch and pollution sources was generated, second a Water quality model --WASP7.4-- was adopted to simulate the water quality status. This model was calibrated and used to simulate different scenarios to solve the water quality problems, and third a VBA model was developed to present all data in a GIS toolbar with the WASP model results for different simulation scenarios. The results showed that the developed model could facilitate assessing and predicting for water pollution based on GIS, and can provide easier process for decision making to decrease the water pollution.

KEY WORDS: Rosetta Branch, GIS, Water quality,
WASP7.4, VBA

TABLE OF CONTENTS

CHAPTER V

5.0 ANALYSIS AND DISCUSSION

LIST OF FIGURES