BUSITEMA UNIVERSITY
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF WATER RESOURCES AND MINING ENGINEERING

FINAL YEAR PROJECT

DETERMINING POTENTIAL POINTS OF POLLUTION IN A RIVER CATCHMENT USING GIS and REMOTE SENSING

GALIWANGO HILARY

BU/UG/2012/161

Email: galihinary@yahoo.com: Tel: +256 700 300 773

MAIN SUPERVISOR: Mr. KIMERA DAVID
CO-SUPERVISOR: Mr. KAVUMA CHRIS

A final year project report submitted in partial fulfillment of the requirements for the award of a Bachelor of Science in Water Resources Engineering Busitema University

ABSTRACT

The quality of surface water in many areas of the world is being deteriorated from both point and non-point sources however this study focuses on factors enhancing surface water pollution from non-point sources which is a necessity to enable implementation of management practices that control and prevent pollution. In this study, the basic factors enhancing pollution of surface water were identified including five factors—Land use/landcover, Flow accumulation, slope map, soil infiltration, and distance from streams and their thematic layers were prepared from some maps and satellite images by the remote sensing techniques, digitized and integrated in the GIS environment using Weighted Index Overlay Analysis (WIOA) method. The weights of different factors were objectively determined during the research. Through this integrated GIS analysis, potential risk pollution map of the study area was prepared. This work needs to be verified by further analysis of the potential risk polluting areas and also putting in consideration factors like soil depth and ground water depth and flow.

The output of the overlay in the pollution risk map were verified by looking at the Google Earth imagery and incorporation of USGS overlays (contours) in them and field visits in some cases were done. The study revealed that this approach can be used by decision makers as a land use planning tool.

DECLARATION

I GALIWANGO HILARY do here by declare that this project report is my original work and to the best of my knowledge, it has never been published and submitted for the award of any academic qualification in any University before.

Signature.....

GALIWANGO HILARY

APPROVAL

This is to certify that this project report by GALIWANGO HILARY of registration number BU/UG/2012/161 '**DETERMINING POTENTIAL RISK AREAS OF POLLUTION IN A RIVER CATCHMENT USING GIS and REMOTE SENSING**' has been carried out under my supervision and is now ready for submission to the academic board of Busitema University with my approval.

Main Supervisor

MR. KIMERA DAVID

Signature..... Date.....

Co-supervisor

MR. KAVUMA CHRIS

Signature..... Date.....

DEDICATION

This reserach is dedicated to my dear family; -(LATE) Mr. Kizito Godfrey(Requiescat in pace), Mrs Mubiru Ritah, Mr. Mubiru Patrick, Sanyu Hadija, Kiberu Jovan, Mukasa Tonny and Nakawooya Hildah for their support, heart calming and sensation words that encouraged me to move on in times of discouragement. May the almighty God bless the works of your hands!

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LIST OF ACRONYMS/ABBREVIATIONS

USGS	-	United States Geological Survey
NPS	-	Non Point Sources
AgNPS	-	Agricultural Non Point Sources
ANSWERS	-	Areal Nonpoint Source Watershed Environmental Response Simulation
GIS	-	Geographical Information System
MWE	-	Ministry of Water and Environment
UN	-	United Nations
DWD	-	Directorate of Water Development
DWRM	-	Directorate of Water Resources Management
DGSM	-	Directorate of Geological Survey and Mines
NEMA	-	National Environment Management Authority
NFA	-	National Forestry Authority
NARO	-	National Agricultural Research Organisation
NWSC	-	National Water and Sewerage Cooperation
GLCF	-	Global Land Cover Facility
ETM+	-	Enhanced Thematic Mapper
WIOA	-	Weighted Index Overlay Analysis
FAO	-	Food and Agricultural Organisation
LCC	-	Land Capability Classification
ESA	-	European Space Agency
ESRI	-	Environmental Systems Research Institute

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1 CHAPTER ONE

1.1 INTRODUCTION

This chapter includes the following; back ground to the study, statement of the problem, objectives of the study, justification, scope of the study, limitations, and the project area.

1.2 BACK GROUND

Water covers a big portion of the earth is the source of life but only 3% of the world's water is fit for human consumption due to its being fresh (USGS, 2016). As it flows through rivers and streams of the earth, water supports life just like blood flowing in the blood vessels of a person. Unfortunately over time this finite resource which is very essential for life is being polluted as it flows in the cycle.

The escalating levels of pollution in water bodies most especially in rivers shows that there is inefficiency in controlling non-point polluting sources and this is mainly because of the difficulty found in identifying the most polluting points in the catchment. In turn many problems are caused to the ecosystem and high costs of raw water treatment. This calls for control measures to aid the decision makers and stakeholders to avert the problem at hand. Protecting the water resources requires an in-depth knowledge of the dynamic behavior of the watershed. Because of increased pressure on these vital resources it has become essential for resources planners to adopt ways and means for analyzing problems associated with space and time (Jasrotia & Singh 2006).

In most Ugandan rivers, the water quality has greatly been deteriorated in the past decades, and this is as a result of increasing anthropogenic activities such as industrialization, mining activities, and agricultural activities mainly those dependent on use of artificial fertilizers and poor municipal wastewater and wastes management.

The activities carried out in the river's catchment will have a great impact on the quality of the water in a given river, also depending on the catchment/basin characteristics like land use/land cover, elevation and slope, rainfall intensity, soil type, among others.

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