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Review Article

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River Corridor Development Based Water Quality Studies: A Review of Research Framework

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Abstract River water quality become 'victim' of human development through agricultural, industrial, residential, sewage treatment plant, municipal waste, and commercial activities. These research studies carry out to investigate, identify, and determine the water quality condition through WQI methods towards Sungai UTM. Research framework become initiative towards this research study in assist to archive the objective study in solving issues and problems involve with river water pollution.

Keywords River water quality, river water pollution, WQI, Sungai UTM, research framework

Introduction

According to the Department of Environment (DOE, 2008) peninsular Malaysia has 150 major rivers, the longest river in the peninsula is the Pahang River where it flows as far as 432 kilometers before entering the South China Sea. The rivers that exist in other states like Kelantan, Terengganu, Dungun, Endau, and Sedeili also flows out in the South China Sea. While in Sabah and Sarawak have larger rivers of peninsular Malaysia. There is the longest river Rejang River which is located in Sarawak State where it flows as far as 563 kilometers.

However, the problem of water pollution is an issue that is often spoken of today. This problem occurs due to the disposal of sewage from municipal and industrial process into the aquatic system and caused water quality to deteriorate (Hua and Kusin, 2015). The report released by the Department of Environment (DOE, 2008) found that the main causes leading to the deterioration of water quality is domestic sewage, industrial, animal husbandry and agro-based industries. There are many parameters used to assess the water quality of a river. It includes physical parameters (pH and dissolved oxygen), nutrients (ammonia and phosphate) and metals (cadmium and copper).

In general, the pollution can be defined as any substance harmful to humans or the environment which enters into water sources where it is not supposed to be present, and if present, higher than allowed. Based on gross observations factor that greatly contributed to the pollution of a river that is from the activities of land use by humans around it.

There are two sources of pollution and pollution from point sources of pollution also causes not dotted. The cause of colon refers to the sources of contamination and can easily be detected with the naked eye where the activities continue to distribute this type of waste and disposed of directly through a duct system into rivers such as domestic sewage, waste from animal husbandry, agricultural distribute sewer filth, industrial waste. The cause is not the cause of which was dotted agents and material contamination is not known. They pollute rivers with rain water action either by surface runoff or through seepage into the ground. The contaminants are carried by runoff into rivers and some seeped into the ground. Therefore, to maintain the interest it requires an increase in river water quality. It can be achieved through the maintenance of the river. Therefore, a maintenance plan must be produced.

Problem Statement

The most critical question is about water quality in the River UTM, where it will flow to major rivers such as Sungai Skudai. As we all know, the UTM is close to the infrastructure around the university. This river goes through a row of student residential block, administrative buildings, roads, blocks faculty, and research labs around the university. In recent years, the water quality of the River UTM start undisputed as more and more compact development is being carried out in early 2009 (Ma'arof and Hua, 2015). For example, the building blocks of a new faculty, the construction of laboratories located along the river corridor UTM. In fact, the river is also through many rows of food stalls around the university. This is to some extent will produce effluent that goes along intentionally or unintentionally.

The causes of pollution that exist are from various domestic activities or the activities of a very high land use along the river corridor UTM. As told from the beginning, the development of land use that arise along the river corridor UTM is one of the causes. Problems arise as a result of activities in food waste disposal, soil erosion and possibly laboratory waste or waste from construction material which is not disposed of properly. Looking at the problems that exist, indirectly aquatic life in the river will be affected and cause discomfort to the health and aesthetic values.

In addition, another problem that arises is that high deposition rates makes the riverbed became increasingly shallow. The deposited sediments can lead to increased flow velocity of the river flow. If this happens, the water will spill out and sloped areas around the lower. Suspended debris in the water will be washed away into the river after heavy rains in the neighborhood. This is to some extent can muss and give off an unpleasant smell to the locals and have an adverse impact on aesthetic value.

If the problem persists pollution UTM River water quality will be affected not only in terms of water quality of the river but UTM own aesthetic value and it in turn can threaten the health of students and employees who carry out activities in the vicinity. Although the river is small but it should be noted that the flow of the river will be entered into the main river that will surely be one of our fresh water resources. Therefore, it is important for us to evaluate and assess the impact of development and land use activities are available along the river corridor on the quality of Sungai UTM that a maintenance plan can be generated.

Research Objective

The objectives of the study can be divided into three, which is;

1. To assess the water quality of UTM River based on Water Quality Index (WQI) through an assessment of the BOD, COD, SS, NH_3N, DO, pH.
2. To determine the pattern of land use along the UTM potentially contributing to pollution of the River UTM.
3. Recommended UTM River corridor plan for the preservation of water quality of the River UTM.

Scope of Study

Sungai UTM consists of two major rivers. A study will involve a river in the north. This river starts from the recreation area of the forest reserve of 134 acres and it flows through a number of locations including residential blocks in UTM students at the College of Tun Hussein Onn, cafeteria, and faculty and blocks others. The study will be carried out starting from the cafeteria Arkebchengal. In the middle of this river goes through the Faculty of Civil Engineering, Civil Engineering Laboratory, Faculty of Mechanical Engineering, Faculty of Electrical and downstream of the area where the ends Leisure UTM to UTM hockey field.

Determination of water quality based on several parameters, namely SS, pH, COD, BOD, NH_3N, and DO will be determined (Hua, 2015). In additional, the control method will also be proposed to limit the pollution sources to improve and maintain water quality, either in physical or chemical parameter.

Importance of Study

This study is important in determining the level of the river water quality UTM. UTM River water quality will be evaluated based Air Quality Index (IKA). Air Sungai UTM will either be classified as a class I, II, III, or IV. Also, at the same time the study will identify all the causes that led to the pollution of the River UTM. Identification of pollution sources can help identify contamination that can be limited to UTM River water quality can be maintained. In addition, this research can also provide guidance in drafting or proposing a plan for the river corridor UTM for UTM River water quality maintenance.

Conclusion

Research framework indicate that water quality study will involve with determination of raw water through analysis of BOD, COD, SS, NH_3N, DO, and pH, in identify the Water Quality Index (WQI). WQI are important in investigate the water quality condition of Sungai UTM, which being disruption through human activities like

agricultural, industrial, residential, sewage treatment plan, commercial activities, municipal waste, etc. that have connection with the rapid development of particular area. Generally, land used development are exist in urban area due to the demand from local resident towards daily usage. Therefore, this research study through research framework is important to indicate and proved on the efficacy of WQI in define the water quality studies in Sungai UTM.

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