

STUDY ON CURRENT WATER QUALITY STATUS OF
BALOK RIVER

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NUR ATIYAH IZZATI BINTI W.DERAMAN

Report submitted in partial fulfilment of the requirements
for the award of the degree of
Bachelor Civil Engineering (Hons.)

Faculty of Civil Engineering and Earth Resources
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JUNE 2016

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I hereby declare that I have checked this project report and in my opinion this project is satisfactory in terms of scope and quality for the award of Bachelor of Civil Engineering (Hons).

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ABSTRACT

With two thirds of the earth's surface covered by water and the human body consisting of 75 percent of it, it is evidently clear that water is one of the prime elements responsible for life on earth. Water is an essential resource that sustains life on earth; changes in the natural quality and distribution of water have ecological impacts that can sometimes be devastating. Recently, Malaysian is facing a lot of environmental issues regarding water pollution. The aim of the study was to determine the current water quality status in the Balok River and to classify it based on Water Quality Index (DOE-WQI) and National Water Quality Index (NWQI). The sampling station were selected at three point along Balok River such as Balok River Jetty, residential area of Balok Permai and Balok Perdana which is the effluent of Gebeng industrial area and residential. The water quality parameters were measured by using standard method. The testing on parameters is divided into in-situ test and ex-situ test. Based on results it is found that Balok River was classified under class IV according to the WQI, which the river water is suitable for irrigation only. River pollution was driven by the high content of contaminants and it was reduced the oxygen content in the water. Through the testing found that there was a high concentration of BOD, COD, Ammoniacal Nitrogen and chromium and it may affect the human health and environment. Therefore, precaution to control water pollution in Balok River should be taken immediately by all parties to protect the ecosystem and environmental beauty.

ABSTRAK

Dengan dua pertiga daripada permukaan bumi diliputi oleh air dan tubuh manusia terdiri daripada 75 peratus daripada jumlah itu, ia adalah jelas bahawa air adalah salah satu elemen utama yang bertanggungjawab untuk kehidupan di bumi. Air adalah sumber penting yang mengekalkan kehidupan di bumi; perubahan dalam kualiti semula jadi dan pengalihan air mempunyai kesan ekologi yang kadang-kadang boleh mengakibatkan kemusnahan. Baru-baru ini, Malaysia sedang menghadapi banyak isu-isu alam sekitar mengenai pencemaran air. Tujuan kajian ini adalah untuk menentukan status kualiti air di Sungai Balok dan mengklasifikasikan ia berdasarkan Indeks Kualiti Air (WQI DOE-) dan Indeks Kualiti Air Negara (NWQI). Stesen pensampelan telah dipilih di tiga titik di sepanjang Balok River seperti Jeti Sungai Balok, kawasan perumahan Balok Permai dan Balok Perdana yang merupakan efluen kawasan perindustrian Gebeng dan kediaman. Parameter kualiti air telah diukur dengan menggunakan kaedah piawai. Ujian ke atas parameter dibahagikan kepada ujian in-situ dan ujian ex-situ. Berdasarkan keputusan didapati bahawa Sungai Balok telah diklasifikasikan di bawah kelas IV mengikut WQI, bahawa air sungai tersebut hanya sesuai untuk pengairan sahaja. Pencemaran sungai didorong oleh kandungan yang tinggi daripada bahan cemar dan ia telah mengurangkan kandungan oksigen di dalam air. Melalui ujian ini didapati bahawa terdapat kepekatan yang tinggi oleh BOD, COD, Ammoniakal Nitrogen dan kromium dan ia boleh memberi kesan kepada kesihatan manusia dan alam sekitar. Oleh itu, langkah berjaga-jaga untuk mengawal pencemaran air di Sungai Balok perlu diambil dengan segera oleh semua pihak untuk melindungi ekosistem dan keindahan alam sekitar.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Water is one of the elements and the necessity that most major global to the daily life. Approximately 71% of the surface of the earth is covered by water. From that number, there is only 2.5% is the water surface such as the rivers and lakes which every economic activity for example agriculture, fisheries, mining district, transport and a tourism need water as their water resources (David *et al.*, 2016). Most important use of water to human is as drinking water, wash, and bath. Moreover, the water demand is not only for human beings but also for aquatic life that use water or river as their habitats and this aquatic life eventually become a source of protein for humans (Aweng, *et al.*, 2011)

Nowadays in increasing of urbanization, agricultural and industrial practice brings a bad effect on both surface and ground water and it will rapidly decrease the water quality in term of its physical, chemical and biological characteristics (Ahmad Zaharin *et al.*, 2014). Balok River is one of the polluted rivers that because of agricultural and industrial practice in area nearby. Therefore, water pollution is not any longer new threat for human in urbanization development.

Quality of the surface water is reduced by point and non-point sources pollutants. Point source is sewage, industrial effluent and so on while non-point source is urban and rural runoff from residential area and make river water are unsuitable use for human activity. Legislations are available in the form of Environmental Quality Act (EQA) 1974, which deals mainly with point source pollutants from the domestic and industrial sources. Other regulatory Acts is available to protect the rivers. If the river spared from pollutants, good quality water is very appropriate for running activities such as recreational and social. Discharge of sewage has to be reduced to prevent any contamination over the rivers and undermined health to human beings, animals and plants.

This study was conducted to monitor the water quality in the Balok River as an impact of industrial practice and resident around the river. It is also conducted to survey whether the remaining of bauxite mining in nearby area at Balok River affect the contamination of water in that river.

1.2 Problem Statement

Water pollution is the contamination of water bodies that occur when pollutant are indirectly or directly discharge into water bodies without adequate treatment to remove the harmful sediment (Muyibi *et al.*, 2008). It will give an affect to ecosystem and human life and become an issue nowadays. Besides, water resources are gradually becoming polluted and unavailable due to human or industrial activities. According to Rene´ P (2006), the increasing contamination of freshwater systems with thousands of industrial and natural chemical compounds is one of the key environmental problems facing humanity worldwide.

Balok River is one of several rivers that has in Kuantan and near to the Gebeng industrial area and residential area along the river. Department of Irrigation and Drainage was classified that the status water quality of Balok River was in Class III based on DOE-WQI which is slightly polluted. Gebeng industrial area is actively involved in various types of activities including petrochemical, multifarious industries and the latest rare-earth processing plant. The residential and industrial site is within the

Balok River catchment and all discharges from the residential and industrial site will enter this river system. All the discharge will affect the color, odor and the quality of water. In addition, it also will affect human activities in their daily life such as cooking, tourism and washing and it will threaten aquatic life. This study was conducted in order to measure water quality status in Balok River and to classify the water quality based on Water Quality Index (WQI) that purposed by Department of Environment.

1.3 Objective of Study

The objectives of this study are listed below:

1. To determine the water quality status in the Balok River.
2. To classify the water quality based on Water Quality Index (DOE- WQI).and National Water Quality Index (NWQI)

1.4 Scope of Study

The scope of study for this research is at Balok River which located close to the commercial beach area in Kuantan. The purpose of this research is to identify the water quality status of Balok River and classify the water quality based on Water Quality Index (DOE-WQI). The classifying of water quality based on WQI will involve 12 parameters which are Biochemical oxygen demand (BOD), Chemical oxygen demand (COD), Ammoniacal nitrogen (NH₃), Total suspended solids, Dissolved oxygen (DO), pH, Turbidity, Electrical Conductivity, Selected heavy metal, E-coli and Total Coliform. All parameters will be evaluated based on in-situ test and laboratory test. The quality of water will be classified follow the standard. In this research the standard for water quality determined from Department of Environment which is National Water Quality Standard (NWQS) and to classify the water is based on Water Quality Index.