



***THE SUITABILITY OF BUKIT EKSPLO LAKE FOR WATER BASED
RECREATIONAL PURPOSE BASED ON WATER QUALITY***

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**THE SUITABILITY OF BUKIT EKSPLO LAKE FOR WATER BASED
RECREATIONAL PURPOSE BASED ON WATER QUALITY**



By

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**A project Report Submitted in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Forestry Science in the Faculty of Forestry
Universiti Putra Malaysia**

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DEDICATION

To my beloved family:

Zulbahrin bin Yusof

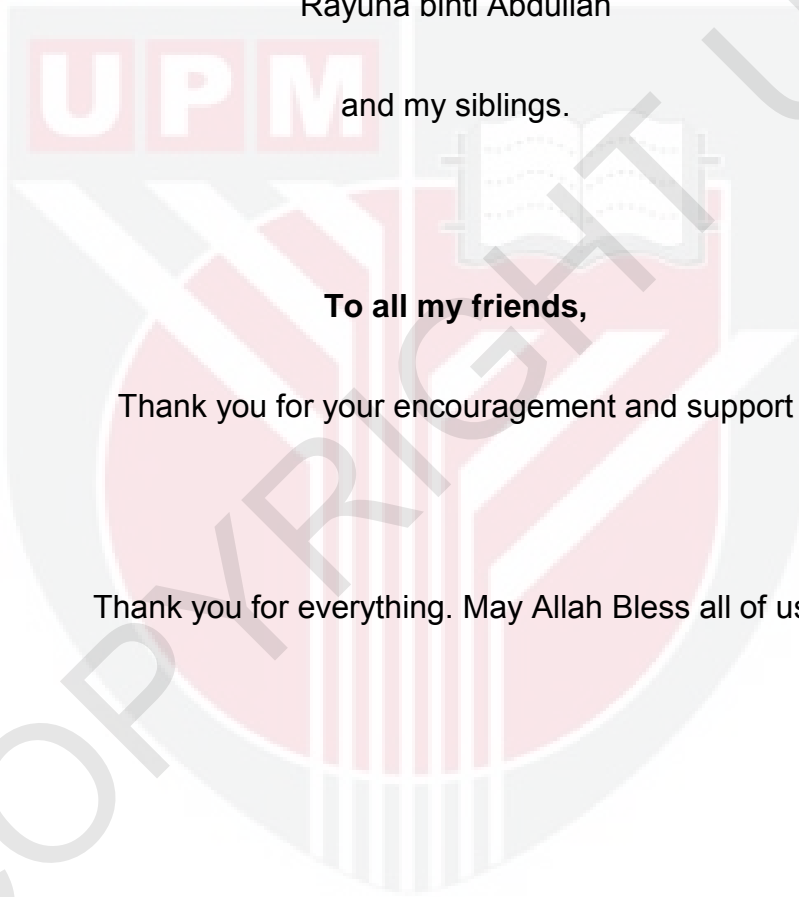
Rayuna binti Abdullah

and my siblings.

To all my friends,

Thank you for your encouragement and support

Thank you for everything. May Allah Bless all of us.



ABSTRACT

Water quality can be used to assess the health of ecosystems, safety for human contact, and water supply. It is important for household, agricultural, industrial and also recreational purposes. Therefore, a study on water quality status of Bukit Ekspo Lake has been carried out to investigate the suitability of the study area to conduct recreational activities and the ability of the lake to purify waste water. The in-situ samples of water pH and Dissolved Oxygen (DO) were taken in situ while samples for Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Ammonia-cal Nitrogen (NH_3N) and Total Suspended Solid (TSS) were analyzed in laboratory. These parameters were measured every week for six weeks period at six stations. Results showed that water quality status at Bukit Ekspo is in Class 3 which indicates that the Bukit Ekspo Lake needs intensive treatment and it is not suitable for recreational activities. Moreover, the lake cannot purify by itself where the Water Quality Index (WQI) at inlet was greater than the outlet. The findings from this study showed Bukit Ekspo Lake are not suitable for water based recreation activities and cannot purify waste water. Therefore the management of this park needs to undertake intensive treatment to improve the water quality of this lake in order to be suitable for water-based recreational activities.

ABSTRAK

Kualiti air boleh digunakan untuk mengukur kesihatan ekosistem, keselamatan tubuh manusia untuk menyentuh air, dan bekalan air untuk diminum. Ia penting untuk keperluan rumah, pertanian, perindustrian dan rekreasi. Oleh itu, kajian mengenai status kualiti air Tasik Bukit Ekspo telah dilakukan untuk menentukan kesesuaian kawasan kajian untuk melakukan aktiviti rekreasi dan keupayaan tasik untuk membersihkan air sisa. Terdapat dua jenis parameter iaitu in-situ dan ex-situ. In-situ merupakan di mana sampel yang diambil terus di lapangan adalah pH air dan Dissolved Oxygen (DO). Ex-situ dibawa ke makmal adalah Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Ammonia-cal Nitrogen (NH_3N) dan Total Suspended Solid (TSS) Parameter ini diukur setiap minggu selama tempoh enam minggu di enam stesen. Keputusan menunjukkan bahawa status kualiti air di Bukit Ekspo adalah di Kelas 3 yang menunjukkan bahawa Tasik Bukit Ekspo memerlukan rawatan intensif dan tidak sesuai untuk aktiviti riadah. Selain itu, tasik itu tidak boleh membuat pembersihan secara sendiri di mana Indeks Kualiti Air (WQI) pada inlet lebih besar daripada outlet. Hasil kajian, menunjukkan Tasik Bukit Ekspo tidak sesuai untuk melakukan aktiviti rekreasi berasaskan air kerana ianya tidak boleh membersihkan air sisa. Oleh itu, rawatan yang lebih intensif perlu dilakukan bagi meningkatkan kualiti air bagi memastikan ianya sesuai digunakan untuk aktiviti rekreasi.

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APPROVAL SHEET

I certify that this research project report entitled 'The suitability of Bukit Ekspo Lake for Water-Based Recreational Purpose Based on Water Quality', by Asmaq Fikriyah Binti Zulbahrin has been examined and approved as a partial fulfillment of the requirements for the Degree of Bachelor of Forestry Science in the Faculty of Forestry, Universiti Putra Malaysia.

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LIST OF ABBREVIATIONS

DO	Dissolved Oxygen
pH	Water pH
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
NH ³ N	Ammonia-Cal Nitrogen
TSS	Total Suspended Solid
DOE	Department of Environment
WQI	Water Quality Index
SIDO	Sub Index DO
SIBOD	Sub Index BOD
SICOD	Sub Index COD
SIAN	Sub Index NH ³ N
SISS	Sub Index SS
SipH	Sub Index pH
SPSS	Statistical Package for Sosial Science
DOE-WQI	Department of Environment - Water Quality Index
INWQS	Interim National Water Quality Standards for Malaysia

CHAPTER 1

INTRODUCTION

1.1 Background

An urban ecosystem is simply the community of plants, animals, and humans that inhabit the urban environment. It is an area physically dominated by built structures like buildings, roads, and tree. Cities and towns are majorly constructed by people. Rapid development of urban area leads to growth of urban population and the built infrastructures to support the needs of urban citizens have affected urban environments (Torrey, 2004).

Urban population also influences their environment where they change their environment through their consumption of food, energy, water, and land. As return, the polluted urban environment will affect the health and quality of life of the urban population (Ksenija, 2016).

Moreover, as more people like to do outdoor recreational activities, the quality of urban environment is greatly important for urban population. Outdoor recreation involves the activities of communities during their free time so that people can enjoy the moment and the beauty of nature and this includes ground and water activities. Water based activities such as fishing; swimming and boating have been recognized as activities that give a beneficial or positive impact towards health (Vesterinen *et al.*, 2010).

Water based recreational activities give a positive influence on health and well-being. According to World Health Organization (WHO), (2003), warm water can help in pain relief and give relaxation to an individual. While swimming is a good exercise form for rehabilitation after hip replacement operation.

Throughout the world, many people involve in the water based recreational activities as part of their choice of leisure and tourism. However, water-based recreational activities have its own risks as individual can be exposed to health issues depending on the conditions of water and location. According to Chekley *et al.*, (2004), bad conditions of water source, water storage and sanitation in Peru have affected child health as the children were 1.0 cm shorter in stature and had 54% more diarrhoea than those with the best household conditions. Other than that, the capability of an individual exposed their physical to water can also cause the illness where there are waterborne microbial pathogens that lead the disease. But the infections were not led to clinical illness (Pond, 2005). The related disease was respiratory disease, ear and eyes complaint.

Water quality that causing health problems to people that conducting water based activities showing that water quality management is very important in order to protect the public health. They should be aware to make the recreation activities fun, safe and alarming the health trend to user (California State Parks, 2005). For example, stakeholders can coordinate the planning and management of activities in appropriate places that have good water quality. Besides, any

water body that can do self-purification which is the ability to rid the pollutants by itself is very important. Self-purification was a removal of organic material, plant nutrients or other pollutants from a lake or stream by the activity of the resident or community. To determine whether the lake can reduce the waste water, it can be shown by the result from the analysis of water quality index.

1.2 Problem Statement

Water Quality status indicates the level of pollutant composition and thus relates to human activities. Poor water quality can affect the health aspect of community such as water supply, hygiene and diarrhea disease (Checkley *et al.*, 2004).

Water-based activities can be considered as one of the high demands in recreational activities. For example, swimming is the second most popular outdoor recreational activity after walking (Vesterinen *et al.*, 2010). That is why water quality was important on recreational purpose for the user.

Bukit Ekspo is one of the places for users to conduct recreational area in Universiti Putra Malaysia which includes activities or classes for students, staff and public users. The water-based activities such kayaking and fishing are usually carried out at Bukit Ekspo. Based on the information from Taman Pertanian Universiti (TPU), the current water quality status for Bukit Ekspo is unknown and the lake suitability for recreational activities is yet to be determined.

Through some observation the condition of lake is not in the best condition where the lake is smelly with cloudy water. As Bukit Ekspo is highly used, it is important to study the status of water quality of the lake. This research will help university management to know current water status of this lake and findings from this research will be beneficial for future management of Bukit Ekspo Lake.

1.3 Objectives

Therefore, this research was conducted:

- To investigate the water quality status of Bukit Ekspo Lake for suitability of water based recreational purpose based on water quality.
- To determine the ability of Bukit Ekspo Lake to purify waste water.

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