



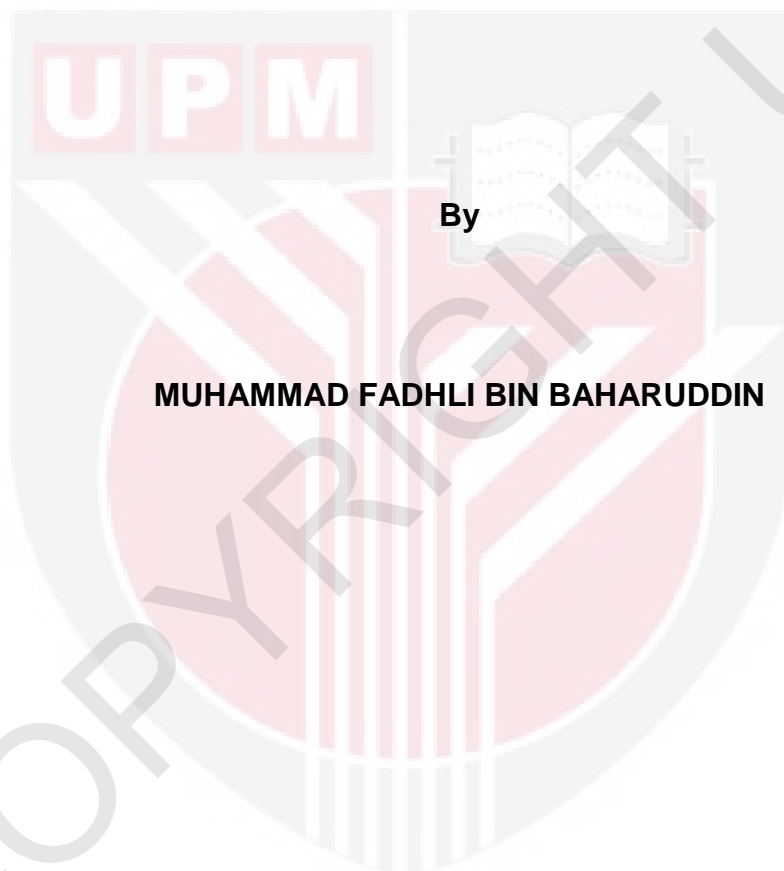
UNIVERSITI PUTRA MALAYSIA

***WATER QUALITY STATUS OF MANGROVE FOREST IN SUNGAI
SEPETANG AND SUNGAI TIRAM LAUT, PERAK***

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**A Project Report Submitted In Partial Fulfillment of the Requirements
for the Degree of Bachelor of Forestry Science in Faculty of Forestry
University Putra Malaysia
43400**

2016

DEDICATION

Bismillahirrahmanirrahim

In the name of Allah, this thesis specially dedicated to

Beloved family

My father Baharuddin bin Khalid, my mother Marina binti Dalib, my sister Norain binti Baharuddin, and my little sister Noor Hidayah binti Baharuddin

&

My truly friends, thanks for the great motivation

For the understanding inspiration and support throughout my study in

Universiti Putra Malaysia

Thank you so much

ABSTRACT

Mangroves are unique forests that live in the area near the sea where salinity levels are high. Mangroves are also an important forest as a natural defense the waves. However these forests are increasingly threatened by human activity in the mangrove swamps. Therefore, this study was done to determine the water quality index of Sungai Sepetang and Sungai Tiram Laut near the area where human activity. The study was conducted to compare the quality of the two rivers. Data collection was taken on six parameters of WQI and five others parameters which are Ammonia-cal Nitrogen ($\text{NH}_3\text{-N}$), chemical oxygen demand (COD), Biochemical Oxygen Demand (BOD), Oxygen (DO), pH, Total Suspended Solids (TSS), electrical conductivity (EC), turbidity (Turbidity), Total Dissolved Solids (TDS), Salinity (Salinity) and temperature. Results obtained are summarized; EC (28.25 - 36.02), pH (7.91 - 8.06), DO (2.39 - 3.76), Turbidity (11.31 - 74.29), TDS (3.31 - 21.63), SAL (2.93 - 20.74), TEMP. (28.69 - 29.86), TSS (3.00 - 4.17), BOD (0.99 - 2.08), COD (47.80 - 54.56) and $\text{NH}_3\text{-N}$ (3.38 - 7.60). Water quality index for both rivers were calculated and were in Class III, which require the treatment to the water supply.

ABSTRAK

Hutan bakau adalah hutan yang unik yang hidup di kawasan berhampiran laut di mana kadar kemasinan yang tinggi. Hutan bakau juga merupakan hutan yang penting sebagai pertahanan ombak semulajadi. Walau bagaimanapun hutan ini semakin terancam daripada aktiviti manusia di kawasan paya bakau. Oleh yang demikian, kajian ini telah dibuat untuk menentukan indeks kualiti air di Sungai Sepetang dan Sungai Tiram Laut di mana berdekatan dengan kawasan aktiviti manusia. Kajian dilakukan untuk membandingkan kualiti di dua sungai tersebut. Pengumpulan data telah diambil berdasarkan enam parameter WQI dan lima parameter lain iaitu Ammonikal Nitrogen ($\text{NH}_3\text{-N}$), Keperluan oksigen kimia (COD), Keperluan Oksigen Biokimia (BOD), Keperluan Oksigen (DO), pH, Jumlah Pepejal Terampai (TSS), Kekonduksian Elektrik (EC), Kekeruhan (Turbidity), Jumlah Pepejal Terlarut (TDS), Kemasinan (Salinity) dan Suhu. Keputusan yang diperoleh diringkaskan; EC (28.25 - 36.02), pH (7.91 - 8.06), DO (2.39 - 3.76), Turbidity (11.31 - 74.29), TDS (3.31 - 21.63), SAL (2.93 - 20.74), TEMP. (28.69 - 29.86), TSS (3.00 - 4.17), BOD (0.99 - 2.08), COD (47.80 - 54.56) dan NH_3N (3.38 - 7.60). Indeks kualiti air untuk kedua-dua sungai telah dikira dan berada dalam Kelas III yang memerlukan rawatan untuk bekalan air.

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APPROVAL SHEET

I certify that this research project entitle “Water Quality Status Of Mangrove Forest in Sungai Sepetang and Sungai Tiram Laut, Perak” by Muhammad Fadhli bin Baharuddin has been examined and approved as a fulfillment of the requirements for the degree of Bachelor of Forestry Science in the Faculty of Forestry, Universiti Putra Malaysia.

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TABLE OF CONTENTS

	Page
DEDICATION	i
ABSTRACT	ii
ABSTRAK	iii
ACKNOWLEDGMENTS	iv
APPROVAL SHEET	v
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST ABBREVIATIONS	xi
CHAPTER	
1 INTRODUCTION	
1.1 Background	1
1.2 Problem Statement	3
1.3 Objective	4
2 LITERATURE REVIEW	
2.1 Mangrove Forest	5
2.2 Status of Mangrove Forest	8
2.3 Water	9
2.4 Tidal Cycle	9
2.5 Water Pollution	11
2.6 Sources of Water Pollution	11
2.7 Water Quality	12
2.8 Water Quality Monitoring	13
2.9 Physical and Chemical Parameter	14
2.9.1 pH	14
2.9.2 Dissolve Oxygen (DO)	15
2.9.3 Biochemical Oxygen Demand (BOD)	16
2.9.4 Chemical Oxygen Demand (COD)	17
2.9.5 Total Suspended Solid (TSS)	18
2.9.6 Ammonia-Cal Nitrogen (NH ₃ N)	19
2.9.7 Electrical Conductivity	20
2.9.8 Turbidity	20
2.9.9 Salinity	21
2.9.10 Temperature	22
2.9.11 Total Dissolve Solid	23
2.10 Water Quality Index (WQI)	23

3	METHODOLOGY	
3.1	Study Area	26
3.2	Sampling Station	27
3.3	Sampling Method	29
3.4	Water Quality Analysis	29
3.4.1	In-Situ Measurement	31
3.4.2	Ex-Situ Measurement	31
3.5	Water Quality Index (WQI)	34
3.6	Data Analysis	35
4	RESULTS AND DISCUSSION	
4.1	Water Quality Parameter	36
4.1.1	Electrical Conductivity	36
4.1.2	pH	37
4.1.3	Dissolve Oxygen	38
4.1.4	Turbidity	39
4.1.5	Total Dissolve Solids (TDS)	40
4.1.6	Salinity	41
4.1.7	Temperature (°C)	42
4.1.8	Total Suspended Solids (TSS)	43
4.1.9	Biochemical Oxygen Demand (BOD)	44
4.1.10	Chemical Oxygen Demand (COD)	45
4.1.11	Ammonia-cal Nitrogen (NH ₃ N)	46
4.2	Water Quality Index	47
4.3	Different mean between Sungai Sepetang and Sungai Tiram Laut	49
5	CONCLUSION AND RECOMMENDATION	
5.1	Conclusion	52
5.2	Recommendation	53

REFERENCES

APPENDICES

Appendix A: Equipments

Appendix B: Calculation of DOE-WQI

LIST OF TABLES

TABLE		PAGE
2.1	Water Quality Index Classification	25
2.2	Water Quality Status	25
3.1	Coordinates of Sampling Station in Sungai Sepetang	27
3.2	Coordinates of Sampling Station in Sungai Tiram Laut	28
3.3	Apparatus that has been used for in-situ data collection	30
3.4	Calculating For Sub Index Parameter (DOE, 2005)	35
4.1	Mean comparison between Sungai Sepetang and Sungai Tiram Laut	48

LIST OF FIGURES

2.1	Distribution of mangrove forest around the world	6
2.2	Example of tide chart	10
3.1	Map of Studied Area	26
3.2	Map of Sungai Sepetang	27
3.3	Map of Sungai Tiram Laut	28
4.1	Mean comparison of electro conductivity between rivers	36
4.2	Mean comparison of pH between rivers	37
4.3	Mean comparison of Dissolve Oxygen between rivers	38
4.4	Mean comparison of Turbidity between rivers	39
4.5	Mean comparison of total dissolve solids between rivers	40
4.6	Mean comparison of salinity between rivers	41
4.7	Mean comparison of temperature between rivers	42
4.8	Mean comparison of total suspended solids between rivers	43
4.9	Mean comparison of Biochemical Oxygen Demand (BOD) between rivers	44
4.10	Mean comparison of Chemical Oxygen Demand (COD) between rivers	45
4.11	Mean comparison of Ammonia-cal Nitrogen (NH ₃ -N) between rivers	46
4.12	Water quality index and classes of river of Sungai Sepetang and Sungai Tiram Laut	47

LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
AN or NH ₃ -N	Ammonia-cal Nitrogen
APHA	American Public Health Association
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
CWT	Clean Water Team
DO	Dissolved Oxygen
DOE	Department of Environment
EC	Electrical Conductivity
EPA	Environmental Protection Agency
NQWS	National Quality Water Standard
TSS	Total Suspended Solids
WQI	Water Quality Index
SAS	Statistical Analysis System
NTU	Nephelometric Turbidity Unit
PSU	Practical Salinity Unit
USEPA Agency	United States Environmental Protection
WWF	World Wide Fund

CHAPTER 1

INTRODUCTION

1.1 Background

Mangrove is a type of forest which is growing along tidal mudflats and along shallow water coastal area extending inland along rivers, streams and their tributaries where the water is generally brackish, this forests live in the elevation below 300 meter from sea level and growing in harsh environmental condition which in high salinity, high temperature, extreme tides, high sedimentation and muddy anaerobic soil. This forest grows well along the river bank, estuaries and costal, where saline and fresh water meets (Seca et al., 2011). Most live on muddy soil, but some also grow on sand, peat, and coral rock. They live in water up to 100 times saltier than most other plants can tolerate. These forests are considered to be highly productive tropical ecosystems (Tripathy et al., 2005).

Mangrove areas are ecologically sensitive and also it provides physical protection for the communities, this forest also plays an important role in supporting tropical estuaries and costal ecosystem. A fact has discovered that the mangrove forests represent important sources of carbon and nutrient to the adjacent lagoon and costal systems. Mangrove forest is the unique type of forest that is known has a unique features and special adaptation. They have breathing roots that allow them to live and survive in the mud, anaerobic condition and salty water.

Mangrove plays an important role in maintaining coastal ecosystem and providing a variety of environmental support. Mangrove also gives a protection for myriad of juvenile aquatic species, as habitat for variety fauna and source of nutrients that helps to sustain many complex food chains. Mangrove also functioned in shield coastline from cyclone, storm surge and other natural disaster by reducing wave energy and stabilizes sediment (WWF, 2013). In other word, mangroves perform several functions such as inundation control, protection from erosion, storm, floods, and wave damage, recreation and tourism, and generate tangible goods such as fish and shellfish and forest products. They possess distinct ecological attributes at multiple levels of organization such as site or stand, ecosystem and landscape levels.

There is more than 200,000 km² of sheltered tropical and subtropical coastline has been covered by the mangrove forest a long time ago. However, these mangrove forests are more likely decreasing worldwide at 1 or 2% every year, which is the rate is greater than or more equal to declines in adjacent coral reefs or tropical rainforests (Lignon et al.,2011).

Matang Mangrove Forest is one of the well-known mangrove forest because it has well managed. This Matang Mangrove Forest was designated as Permanent Forest Reserve in 1906. There is been approximated about 641,886 ha of mangrove forest in Malaysia where the mangrove forests covered about 106,554 ha in Peninsular Malaysia, while 167,312 ha and

386,000 ha mangrove forest covered in Sarawak and Sabah, respectively (Shukor, 2004).

1.2 Problem Statement

Water quality is an important factor in determining the status of the water either polluted or unpolluted. During the globalization era there are many kind of development happened. Mangrove forest also not gets away from these developments. Mangrove forest is very sensitive ecosystems and because of disturbance of these mangrove forests, it may cause the decreasing in biodiversity. Some activities cause effect to the mangrove such as optimize harvesting, deforestation, agricultural land, and waste from industrial this activity is due to the increasing rate of population.

Every year, there is a lot of area of the mangrove forest that is demolished with purpose either to make a new development area which is for human population, development of aquaculture purposes which like being the most issue is the shrimp pond, and lastly the effect of agricultural activities as example is oil palm plantations. At Sungai Sepetang and Sungai Tiram Laut, some land clearing activities such as for agriculture use, industrial, housing, and others has already happened. Mangrove forest plays an important roles in mangrove ecosystem, one of it is mangrove forest provide fresh water to human life either the water sources is use for daily lives.

Without a good planning in managing the mangrove forest and harvesting, the uncontrolled exploitation and exploration of mangrove forest will become negative impact to the environment such as unprotected costal area, this may cause sand erosion and will reduced the land area and impact on water quality of mangrove forest area and finally impact the aquatic life also wildlife in the mangrove area. Therefore a study has been done in determine and understanding water quality status of mangrove forest at Sungai Sepetang and Sungai Tiram Laut.

1.3 Objectives

- 1) To assess the water quality index of mangrove forest in Sungai Sepetang and Sungai Tiram Laut.
- 2) To compare the water quality status of Sungai Sepetang and Sungai Tiram Laut.

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