DISTRIBUTION OF NUTRIENTS (NITRATE, NITRITE, AMMONIA AND ORTHO-PHOSPHATE) CONTENT, PRIMARY PRODUCTIVITY AND CHLOROPHYLL-*a* IN THE MERCHANG RIVER, MARANG, TERENGGANU

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2008

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By

Rizwan Bin Nordin

Research report is submitted in partial fulfillment of
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RESEARCH PROJECT FINAL YEAR FINAL DRAFT APPROVAL AND VALIDATION FORM I AND II

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LIST OF CONTENTS

		Pages
VALIDATION		iii
ACKNOWLEDGEMENT		iv
LIST OF CONTENTS		v
LIST OF TABLES		x
LIST OF FIGURES		xi
LIST OF ABBREVIATIONS/SYMBOLS		xiii
LIST OF APENDIXS		xv
ABSTRACT		xviii
ABSTRAK		xx
CHAPTER 1	**INTRODUCTION AND OBJEKTIF**	1
1.1	Objectives	4
1.2	Justification	4
CHAPTER 2	**LITERATURE REVIEW**	5
2.1	Estuary or lagoon	5
2.2	Primary productivity and chlorophyll-*a*	6
2.3	Nutrient	7
2.4	Phosphorus	7

2.4.1 Phosphorus form in sea water 8

2.4.2 Phosphorus cycle 10

2.5 Nitrogen 11

2.5.1 Nitrate 11

2.5.2 Nitrite 12

2.5.3 Ammonia 13

2.5.4 Nitrogen cycle 14

CHAPTER 3 METHODOLOGY

3.1 Description of the study area 15

3.2 Sampling method 17

3.3 Water sample analysis 17

3.3.1 Light-dark bottle dissolved oxygen and Winkler method 18

3.3.1a Reagent and apparatus (primary productivity) 18

3.3.1b Method to determine primary productivity 19

3.3.1c Flow chart (primary productivity) 22

3.3.2 Chlorophyll-a analysis 23

3.3.2a Reagent and apparatus (Chlorophyll-a) 23

3.3.2b Method to determine Chlorophyll-a 23

3.3.2c Flow chart (Chlorophyll-a) 25

3.3.3 Ortho-phosphate analysis 26

3.3.3a Reagent and apparatus (ortho-phosphate) 26

3.3.3b Method to determine ortho-phosphate 27

3.3.3c Flow chart (ortho-phosphate) 28

3.3.4 Nitrate analysis 28

3.3.4a Reagent and apparatus (nitrate) 28

3.3.4b Method to determine nitrate 30

3.3.4c Flow chart (nitrate) 31

3.3.5 Nitrite analysis 32

3.3.5a Reagent and apparatus (nitrite) 32

3.3.5b Method to determine nitrite 32

3.3.5c Flow chart (nitrite) 33

3.3.6 Ammonia analysis 34

3.3.6a Reagent and apparatus (ammonia) 34

3.3.6b Method to determine ammonia 35

3.3.6c Flow chart (ammonia) 36

3.4 Statistic analysis 36

CHAPTER 4 RESULTS 37

4.1 Physical water parameter 37

(temperature, dissolved oxygen, salinity pH)

4.1.1 Temperature 38

4.1.2 Dissolved oxygen 40

4.1.3 Salinity 42

4.1.4 pH 44

4.2 Water sample analysis 45

4.2.1 Primary productivity 45

4.2.2 Chlorophyll-a 48

4.2.3 Nitrate 50

4.2.4 Nitrite 52

4.2.5 Ammonia 55

4.2.6 Ortho-phosphate 57

4.3 Nutrient distribution 60

4.3.1 Nutrient distribution in surface water 60

4.3.2 Nutrient distribution in bottom water 64

CHAPTER 5 DISCUSSION 68

5.1 Water parameter 68

5.2 Water sample analysis 71

5.2.1 Primary productivity 71

5.2.2 Chlorophyll-a 73

5.2.3 Nitrate 74

5.2.4 Nitrite 76

5.2.5 Ammonia 77

5.2.6 Ortho-phosphate 78

5.3 Cage culture and agriculture effects on distribution of nutrient 80

CHAPTER 6 CONCLUSION 82

REFERENCES 83

APPENDIXS 88

CURRICULUM VITAE 151

LIST OF TABLES

			Pages
Table 3.1	:	Sampling coordinates for each sampling location	16
Table 4.1	:	Physical water parameter for the first sampling	37
Table 4.2	:	Physical water parameter for the second sampling	38
Table 4.3	:	Primary productivity (mgC/m^3/hr) during the first sampling.	45
Table 4.4	:	Primary productivity (mgC/m^3/hr) during the second sampling.	46
Table 4.5	:	Chlorophyll-a (mg/m^3) during the first and second sampling.	48
Table 4.6	:	Nitrate concentration (mg/L) during the first and second sampling.	50
Table 4.7	:	Nitrite concentration (mg/L) during the first and second sampling.	52
Table 4.8	:	Ammonia concentration (mg/L) during the first and second sampling.	55
Table 4.9	:	Ortho-phosphate concentration (mg/L) during the first and second sampling.	57
Table 4.10	:	Nutrient distribution (mg/L) in surface water during the first sampling.	60
Table 4.11	:	Nutrient distribution (mg/L) in surface water during the second sampling.	61
Table 4.12	:	Nutrient distribution (mg/L) in bottom water during the first sampling.	64
Table 4.13	:	Nutrient distribution (mg/L) in bottom water during the second sampling.	65

LIST OF FIGURES

			Pages
Figure 2.1	:	Phosphorus cycle	10
Figure 2.2	:	Nitrogen cycle	14
Figure 3.1	:	Map of Merchang River, Marang, Terengganu	15
Figure 3.2	:	Flow chart for primary productivity analysis	22
Figure 3.3	:	Flow chart for chlorophyll-a analysis	25
Figure 3.4	:	Flow chart for ortho-phosphate analysis	28
Figure 3.5	:	Flow chart for nitrate analysis	31
Figure 3.6	:	Flow chart for nitrite analysis	33
Figure 3.7	:	Flow chart for ammonia analysis	36
Figure 4.1	:	Temperature profile at Merchang River, Marang, Terengganu during first sampling and second sampling.	39
Figure 4.2	:	Dissolved oxygen profile at Merchang River, Marang, Terengganu during first sampling and second sampling.	41
Figure 4.3	:	Salinity profile at Merchang River, Marang, Terengganu during first sampling and second sampling.	43
Figure 4.4	:	pH profile at Merchang River, Marang, Terengganu during first sampling and second sampling.	45
Figure 4.5	:	Primary productivity rate profile at station 1, station 3 and station 5 at Merchang River, Marang, Terengganu during first and second sampling.	47
Figure 4.6	:	Chlorophyll-a rate (mg/m^3) profile at Merchang River, Marang, Terengggganu during first sampling and second sampling.	49

Figure 4.7	:	Profile of nitrate concentration (mg/L) at Merchang River, Marang, Terengganu during first sampling and second sampling.	51
Figure 4.8	:	Profile of nitrite concentration (mg/L) at Merchang River, Marang, Terengganu during first sampling and second sampling.	54
Figure 4.9	:	Profile of ammonia concentration (mg/L) at Merchang River, Marang, Terengganu during first sampling and second sampling.	56
Figure4.10	:	Profile of ortho-phosphate concentration (mg/L) at Merchang River, Marang, Terengganu during first sampling and second sampling.	59
Figure 4.11	:	Nutrient distribution in surface water at Merchang River, Marang, Terengganu during first and second sampling.	63
Figure 4.12	:	Nutrient distribution in bottom water at Merchang River, Marang, Terengganu during first and second sampling.	67

LIST OF ABBREVIATIONS/SYMBOLS

$C(H_2O)$	=	carbohydrate
$CuSO_4.5H_2O$	=	copper sulfate
$C_{12}H_{14}N_2.2HCl$	=	N- (1-napthyl) --ethylenediamine dihydrochloride
C_3H_6O	=	aceton
$C_4H_4O_7Sb$	=	potassium antimonyl-tartrate
$C_6H_8O_6$	=	ascorbic Acid
CO_2	=	carbon dioxide
$Ca_5(PO_4)_3(OH,F)$	=	apatit
H_2O	=	water
H_2SO_4	=	sulfuric Acid
$MgCO_3$	=	magnesium Carbonate
$(NH_4)_6Mo_7O_{24}.4H_2O$	=	ammonium molybdate
NH_4Cl	=	ammonium chloride
$4\text{-}N_2H_8C_6SO_2$	=	sulfanilamide
O_2	=	oxygen (gas)
P	=	phosphorus
PO_4^{3-}	=	ortho-phosphate
GPS	=	Global Positioning System
°C	=	degree Celsius
atm	=	atmosphere pressure

cm	=	centimeter
g	=	gram
L	=	liter
mg/L	=	milligram per liter
mg/m^3	=	milligram per meter cubic
ml	=	milliliter
nm	=	nanometer
ppt	=	part per thousand (salinity measurement)
µm	=	micrometer (micron)
N_2	=	nitrogen gas
NH3	=	ammonia
NH4+	=	ammonium ion
NO2-	=	nitrite
NO3-	=	nitrate
w/v	=	weight/volume
v/v	=	volume/volume

LIST OF APENDIXS

			Pages
APPENDIX 1	:	Primary productivity data during first sampling.	88
APPENDIX 2	:	Primary productivity data during second sampling.	89
APPENDIX 3	:	Chlorophyll-*a* data during first and second sampling	90
APPENDIX 4	:	Nitrate data for surface and bottom water on the first sampling	91
APPENDIX 5	:	Nitrate data for surface and bottom water on the second sampling.	92
APPENDIX 6	:	Nitrite data for surface and bottom water on the first sampling.	93
APPENDIX 7	:	Nitrite data for surface and bottom water on the second sampling.	94
APPENDIX 8	:	Ammonia data for surface and bottom water on the first sampling.	95
APPENDIX 9	:	Ammonia data for surface and bottom water on the second sampling.	96
APPENDIX 10	:	Ortho-phosphate data for surface and bottom water during first sampling.	97
APPENDIX 11	:	Ortho-phosphate data for surface and bottom water during second sampling.	98
APPENDIX 12	:	Anova two ways without replication - Primary productivity	99
APPENDIX 13	:	Anova two ways without replication - Chlorphyll-*a*	101

APPENDIX 14	:	Anova two ways without replication - Nitrate	103
APPENDIX 15	:	Anova two ways without replication - Nitrite	105
APPENDIX 16	:	Anova two ways without replication - Ammonia	107
APPENDIX 17	:	Anova two ways without replication - Ortho-phosphate	109
APPENDIX 18	:	Anova two ways without replication - Surface nutrient distribution	111
APPENDIX 19	:	Anova two ways without replication - Bottom nutrient distribution	113
APPENDIX 20	:	Regression test on first sampling - Primary productivity and chlorophyll-a	115
APPENDIX 21	:	Regression test on second sampling - Primary productivity	117
APPENDIX 22	:	Regression test on first sampling - Nitrate (s) with chlorophyll-*a*	119
APPENDIX 23	:	Regression test on first sampling - Nitrate (b) with chlorophyll-*a*	121
APPENDIX 24	:	Regression test on first sampling - Nitrite (s) with chlorophyll-*a*	123
APPENDIX 25	:	Regression test on first sampling - Nitrite (b) with chlorophyll-*a*	125
APPENDIX 26	:	Regression test on first sampling - Ammonia (s) with chlorophyll-*a*	127
APPENDIX 27	:	Regression test on first sampling - Ammonia (b) with chlorophyll-*a*	129
APPENDIX 28	:	Regression test on first sampling - Ortho-phosphate (s) with chlorophyll-*a*	131

APPENDIX 29	:	Regression test on first sampling - Ortho-phosphate (b) with chlorophyll-*a*	133
APPENDIX 30	:	Regression test on second sampling - Nitrate (s) with chlorophyll-*a*	135
APPENDIX 31	:	Regression test on second sampling - Nitrate (b) with chlorophyll-*a*	137
APPENDIX 32	:	Regression test on second sampling - Nitrite (s) with chlorophyll-*a*	139
APPENDIX 33	:	Regression test on second sampling - Nitrite (b) with chlorophyll-*a*	141
APPENDIX 34	:	Regression test on second sampling - Ammonia (s) with chlorophyll-*a*	143
APPENDIX 35	:	Regression test on second sampling - Ammonia (b) with chlorophyll-*a*	145
APPENDIX 36	:	Regression test on second sampling - Ortho-phosphate (s) with chlorophyll-*a*	147
APPENDIX 37	:	Regression test on second sampling - Ortho-phosphate (b) with chlorophyll-*a*	149

ABSTRACT

Productivity and nutrient content study in the Merchang River, Terengganu were conducted during the pre-monsoon period (October) and monsoon period (January). Mean nitrate concentration in the surface and bottom water during the first sampling were 1.145 mg/L and 0.792 mg/L respectively while during the second sampling were 0.734 mg/L and 0.689 mg/L respectively. For nitrite, the mean concentration during the first sampling were 0.254 mg/L and 0.221 mg/L respectively while during the second sampling were 0.097 mg/L and 0.072 mg/L respectively. For ammonia the mean concentration during the first sampling were 1.323 mg/L and 0.776 mg/L respectively while during the second sampling were 2.008 mg/L and 2.137 mg/L respectively. For ortho-phosphate, the mean concentration during the first sampling were 0.743 mg/L and 0.436 mg/L respectively while during the second sampling were 0.962 and 0.854 mg/L (0.440 – 1.963 mg/L) respectively. The mean concentration for chlorophyll-a during the first sampling was 0.026 mg/m^3 while for the second sampling was 0.018 mg/m^3. Mean net productivity for the first sampling was 382.55 $mgC/m^3/hr$ while for the second sampling was 232.55 $mgC/m^3/hr$. There was a good relationship between productivity and nutrient content where increase in productivity will decrease the nutrient content. Nutrient content during the pre-monsoon period was found to be higher than that during the monsoon period. It was also higher during low tide in the surface water. Station near to the cage culture area had higher nutrient content compared to station away from the area. Nutrient can be a limiting factor for

productivity during monsoon period but not during pre-monsoon period. Nutrient distribution in the studied area can be influenced by two major factors, tidal effect and Northeast Monsoon season. Cage culture and agriculture activity in studied area can also be a factor in controlling the nutrient distribution.

ABSTRAK

Kajian produktiviti dan kandungan nutrien telah dijalankan di Sungai Merchang, Terengganu semasa musim pra-monsun (Oktober) dan pada musim monsun (Januari). Purata kepekatan nitrat dalam air permukaan dan air dasar semasa persampelan pertama ialah 1.145 mg/L dan 0.792 mg/L manakala semasa persampelan kedua kepekatan purata nitrat ialah 0.734 mg/L dan 0.689 mg/L bagi air permukaan dan air dasar. Bagi nitrit, kepekatan purata bagi air permukaan dan dasar pada persamplean pertama ialah 0.254 mg/L dan 0.221 mg/L manakala bagi persampelan kedua ialah 0.097 mg/L dan 0.072 mg/L. Bagi ammonia, kepekatan purata bagi air permukaan dan air dasar semasa persampelan pertama ialah 1.323 mg/L dan 0.766 mg/L manakala bagi persampelan kedua ialah 2.008 mg/L dan 2.137 mg/L. Bagi orto-fosfat, kepekatan purata bagi air permukaan dan air dasar semasa persampelan pertama ialah 0.743 mg/L dan 0.436mg/L manakal bagi persampelan kedua ialah 0.962 mg/L dan 0.854 mg/L. Purata kepekatan bagi klrofil-a bagi persampelan pertama ialah 0.026 mg/m^3 manakal bagi persampelan kedua ialah 0.018 mg/m^3. Purata produktiviti pada persampelan pertama ialah 382.55 $mgC/m^3/jam$ dan bagi persampelan kedua ialah 232.55 $mgC/m^3/jam$. Terdapat hubungan yang nyata antara produktiviti dan nutrien di mana peningkatan produktiviti akan merendahkan kepkatan nutrien dalam air. Nutrien amat tinggi semasa sebelum monsun berbanding semasa monsun. Ia turut dipengaruhi oleh pasang surut di mana kepekatan nutrien tinggi semasa air surut. Stesen berhampiran sangkar ikan mempunyai kandungan nutrien yang tinggi berbanding

kawasan yang jauh dari sangkar ikan. Nutrien merupakan faktor penghad bagi produktiviti semasa musim tengkujuh. Taburan nutrien dipengaruhi oleh aktiviti pasang surut air dan monsun timur laut. Sangkar ikan dan aktivit pertanian di kawasan kajian merupakan elemen yang mengawal taburan dan kandungan nutrien di kawasan kajian.