

ANALYSIS OF NITROGEN AND PHOSPHORUS IN SEWAGE LAGOON,
TRENTO, ITALY, WITH SPECIAL REFERENCE TO

CONCLUSIONS

THESE RESULTS SHOW THAT THE NITROGEN AND PHOSPHORUS
CONCENTRATIONS IN THE SEWAGE LAGOON ARE HIGH AND
VARIABLE, AND THAT THE NITROGEN CONCENTRATION IS
CORRELATED WITH THE PHOSPHORUS CONCENTRATION.

**DISTRIBUTION OF NITROGEN AND PHOSPHORUS IN SETIU
LAGOON, TERENGGANU, SOUTH CHINA SEA**

By

KARIE NG KHAI LI

**Research Report submitted in partial fulfillment of the requirements for
the degree of Bachelor of Science (Marine Science)**

**Department of Marine Sciences
Faculty of Science and Technology
UNIVERSITY SCIENCE AND TECHNOLOGY MALAYSIA
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**JABATAN SAINS SAMUDERA
FAKULTI SAINS DAN TEKNOLOGI
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI
MALAYSIA**

**PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK PENYELIDIKAN I
DAN II**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

Distribution of Nitrogen and Phosphorus in Setiu Lagoon, Terengganu, South China Sea oleh *Karie Ng Khai Li*, No. Matrik *UK 7866* telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Samudera sebagai memenuhi sebahagian daripada keperluan memperoleh *Ijazah Sarjana Muda Sains Sains Samudera*, Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

Disahkan oleh:

Penyelia Utama **PROF. DR. LAW AH THEEM**
Nama: **PENSYARAH**
Cop Rasmi: **Jabatan Sains Samudera**
Fakulti Sains dan Teknologi
Kolej Universiti Sains dan Teknologi Malaysia
21030 Kuala Terengganu

Tarikh: 24/04/2006

Ketua Jabatan Sains Samudera
Nama: **PROF. MADYA DR. HJ. ROSNAN HJ. YAACOB**
Cop Rasmi: **Ketua**
Jabatan Sains Samudera
Fakulti Sains dan Teknologi
Kolej Universiti Sains dan Teknologi Malaysia
21030 Kuala Terengganu

Tarikh: 24/04/06

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TABLE OF CONTENTS

	PAGE	
TITLE PAGE	i	
APPROVAL FORM	ii	
ACKNOWLEDGE	iii	
TABLE OF CONTENTS	iv	
LIST OF TABLE	viii	
LIST OF FIGURE	ix	
LIST OF ABBREATIONS	xi	
LIST OF APPENDICES	xii	
LIST OF MAP	xiii	
ABSTRAK	xiv	
ABSTRACT	xv	
CHAPTER 1	INTRODUCTION	
1.0	Introduction	1
1.1	Objectives	7
CHAPTER 2	LITERATURE REVIEW	
2.1	Sources of Nutrients	8

2.2	Sewage and Nutrient	10
2.3	The Ratio of Nitrogen and Phosphorus	11
2.4	Nitrogen Compounds in the Aquatic System	12
2.5	Nitrogen Cycle	15
2.6	Phosphorus Compounds in the Aquatic System	17
2.7	Phosphorus Cycle	19
2.8	Eutrophication and Nutrient	21

CHAPTER 3 MATERIALS AND METHODS

3.1	Location of Study Area	24
3.2	Sampling Schedule	27
3.3	Hydrological Parameters	27
3.4	Cleaning Glassware	27
3.5	Sampling Technique	28
3.6	Analytical Technique	29
	3.6.1 Dissolve Nitrogen Analysis	30
	3.6.1.1 Total Ammonium Concentration	30
	Determination	
	3.6.1.2 Total Dissolve Nitrogen Concentration	34
	Determination	
	3.6.2 Dissolve Phosphorus Analysis	45

3.6.2.1 Orthophosphate Concentration	45
Determination	
3.6.2.2 Total Phosphorus Concentration	48
Determination	
3.7 Data Compilation and Statistical Analysis	52

CHAPTER 4 RESULTS

4.1 Location of Sampling Sites	53
4.2 Hydrological Parameters	53
4.3 Dissolved Nitrogen Distribution	57
4.3.1 Total Ammonium	57
4.3.2 Total Nitrogen	61
4.4 Dissolved Phosphorus Distribution	64
4.4.1 Orthophosphate	64
4.4.2 Total Phosphorus	67

CHAPTER 5 DISCUSSION

5.0 Discussion	70
5.1 First Sampling	77
5.2 Second Sampling	79
5.3 Third Sampling	81

5.6	The Ratio of Nitrogen and Phosphorus	83
5.5	Comparison of Nutrients Distribution in Present Study with the Previous Study (Year 2004 and 2005)	86

CHAPTER 6 CONCLUSION

6.0	Conclusion	90
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LITERATURE CITED	93
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APPENDICES	98
-------------------	----

CURICULUM VITAE	123
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LIST OF TABLE

No. Table		Page
1.1	A comparison of nutrient concentration(μM) in the surface water of world oceans	6
2.1	Phosphorus Compound	21
3.1	The position of sampling stations	26
3.2	Schedules for Sampling	27
4.2	Average and range of hydrological parameter readings during the first, second and third sampling periods	55
4.3	The average values of nitrogen and phosphorus species in the lagoon water during the first, second and third sampling periods	57
5.1	The N:P ratio in Setiu Lagoon in Setiu Lagoon during first, second, third sampling periods	83
5.2	Comparison of Nitrogen and Phosphorus ratio in Setiu Lagoon Terengganu with other aquatic system in the world	85

LIST OF FIGURES

No. Figure		Page
2.1	Nitrogen cycle	17
2.2	Phosphorus cycle	20
3.1	Analytical techniques for nutrient analysis	29
3.2	Nitrate reduction column	40
3.3	Nitrate reduction column	41
4.1	Distribution of Total Ammonium level in middle layer water at Setiu Lagoon, Terengganu for first, second and third sampling periods	59
4.2	Surfer plot of Total Ammonium (μM) in the middle layer water during first and second sampling periods	60
4.3	Distribution of Total Nitrogen level in middle layer water at Setiu Lagoon, Terengganu for first, second and third sampling periods	62
4.4	Surfer plot of Total Nitrogen (μM) in the middle layer water during first, second, and third sampling periods	63
4.5	Distribution of orthophosphate level in middle layer water at Setiu Lagoon, Terengganu for first, second and third sampling periods	65
4.6	Surfer plot of Orthophosphate (μM) in the middle layer water during first, second and third sampling periods	66
4.7	Distribution of Total Phosphorus level in middle layer water at Setiu Lagoon, Terengganu for first, second and third sampling periods	68
4.8	Surfer plot of Total Phosphorus (μM) in the middle layer water during first, second and third sampling periods	69
5.1	Monthly rainfall and evaporation in Kuala Terengganu in difference monsoon season for year 2005.	72

5.2	The distribution of nutrients species at first, second, and third sampling period in Terengganu Setiu Lagoon.	76
5.3	The Distribution of Total Ammonium of Year 2004, 2005 and Present Study at Terengganu Setiu Lagoon	87
5.4	The Distribution of Total Nitrogen of Year 2004, 2005 and Present Study at Terengganu Setiu Lagoon	88
5.5	The Distribution of Orthophosphate of Year 2004, 2005 and Present Study at Terengganu Setiu Lagoon	88
5.6	The Distribution of Total Phosphorus of Year 2004, 2005 and Present Study at Terengganu Setiu Lagoon	89

LIST OF ABBREATIONS

Abs	-	Absorbance
ALPHA	-	American Publish Health Association
BOD	-	Biological Oxygen Demand
°C	-	Degree Celsius
cm	-	Centimeter
DO	-	Dissolved Oxygen
GFC	-	Glass Microfibre Filters
GPS	-	Portable Global Positioning System
Max	-	Maximum
mg/L	-	Millie Gram Per Liter
Min	-	Minimum
mL	-	Millie Liter
N	-	Normality
NH ₄ ⁺	-	Ammonium
NO ₂ ⁻	-	Nitrite
P	-	Phosphorus
p	-	Probability
ppm	-	Part Per Million
PO ₄ ³⁻	-	Orthophosphate
ST	-	Station
Std.Dev	-	Standard Deviation
TN	-	Total Nitrogen
TP	-	Total Phosphorus
μM	-	Micromole
%	-	Percentage
‰	-	Part Per Trillion (ppt) or g/L

LIST OF APPENDICES

Appendix		Pages
I	Standard Curve of Ammonium, Nitrite and Orthophosphate Analysis in Water	98
II	Recovery Tests of Total Dissolved Nitrogen and Total Dissolved Phosphorus Analysis in Water	101
III	Hydrological Parameters reading for first, second, and third sampling at Terengganu Setiu Lagoon	103
IV	Data Collected during first, second and third sampling in Setiu Lagoon, Terengganu	108
V	Average range, maximum and minimum value for nitrogen and phosphorus concentration in Setiu Lagoon, Terengganu	111
VI	Daily observation rainfall and evaporation data of Kuala Terengganu in 2005	112
VII	Tidal Condition in Terengganu Setiu Lagoon	114
VIII	Statistic Analysis (2-Way-Anova Analysis of Nitrogen and Phosphorus in Terengganu Setiu Lagoon)	115

LIST OF MAP

No. Map		Page
3.1	Map of Sampling Station in Setiu Lagoon	25

ABSTRAK

Kajian projek ini tertumpu kepada taburan nitrogen dan fosforus semasa Southwest monsoon, Inter-monsoon, dan Northeast monsoon. 12 stesen pada kajian tahun lepas dan dua stesen baru dipilih sebagai stesen penyampelan dalam kajian ini. Persampelan pertama, kedua dan ketiga telah dijalankan pada 25 Ogos, 06 Oktober dan 14 Desember pada tahun 2005. Pada persampelan pertama, purata kepekatan jumlah ammonium, jumlah nitrogen, orthofostat dan jumlah fosforus adalah $3.08 \pm 0.04 \mu\text{M}$, $89.68 \pm 0.61 \mu\text{M}$, $1.36 \pm 0.03 \mu\text{M}$, dan $12.60 \pm 0.41 \mu\text{M}$. Pada persampelan kedua adalah $6.69 \pm 0.04 \mu\text{M}$, $130.36 \pm 0.66 \mu\text{M}$, $1.70 \pm 0.05 \mu\text{M}$, dan $15.25 \pm 0.39 \mu\text{M}$ serta persampelan ketiga adalah $8.92 \pm 0.03 \mu\text{M}$, $242.88 \pm 0.55 \mu\text{M}$, $4.56 \pm 0.03 \mu\text{M}$, dan $23.61 \pm 0.47 \mu\text{M}$ masing-masing. Statistik analisis menyatakan bahawa jumlah ammonium ($p=0.0504$) dan orthofosfat ($p=0.8658$) tidak menunjukkan perbezaan yang ketara ($p>0.05$) di antara stesen. Jumlah nitrogen ($p=0.0004$) dan jumlah fosforus ($p=0.0164$) menunjukkan perbezaan ketara ($p<0.05$) di antara stesen. Jumlah ammonium ($p=0.0001$), jumlah nitrogen ($p=0.0000$), dan orthofosfat ($p=0.0044$) menunjukkan perbezaan yang ketara ($p<0.05$) di antara ketiga-tiga persampelan. Jumlah fosforus ($p=0.3184$) tidak menunjukkan perbezaan yang ketara ($p>0.05$) di antara ketiga-tiga persampelan. Kepekatan nitrogen adalah lebih tinggi daripada kepekatan fosforus bagi ketiga-tiga kali persampelan. Kepekatan nitrogen dan fosforus meningkat dari Southwest monsoon ke Inter-monsoon serta ke Northeast monsoon. Purata nisbah N:P bagi persampelan di Lagun Setiu adalah 9:1. Nisbah N:P di lagun adalah lebih rendah daripada lautan di dunia. Setiu Lagun telah mulai dicemari oleh nitrogen dan fosforus kerana kepekatan kedua-dua nutrien semakin meningkat semenjak 2004.

ABSTRACT

This study is mainly aimed to study the distribution of nitrogen and phosphorus during Southwest monsoon, Inter-monsoon, and Northeast monsoon. Twelve sampling stations from previous study and two more new sampling stations were established for the study. The first, second and third sampling was carried out on 25 August, 06 October and 14 December 2005 respectively. During first sampling period, the average values of total ammonium, total nitrogen, orthophosphate, and total phosphorus were $3.08 \pm 0.04 \mu\text{M}$, $89.68 \pm 0.61 \mu\text{M}$, $1.36 \pm 0.03 \mu\text{M}$, and $12.60 \pm 0.41 \mu\text{M}$ while for the second sampling, they were $6.69 \pm 0.04 \mu\text{M}$, $130.36 \pm 0.66 \mu\text{M}$, $1.70 \pm 0.05 \mu\text{M}$, and $15.25 \pm 0.39 \mu\text{M}$ and third sampling, they were $8.92 \pm 0.03 \mu\text{M}$, $242.88 \pm 0.55 \mu\text{M}$, $4.56 \pm 0.03 \mu\text{M}$, and $23.61 \pm 0.47 \mu\text{M}$ respectively. The statistic analysis had suggested that the total ammonium ($p=0.0504$) and orthophosphate ($p=0.8658$) had no significant difference ($p>0.05$) among stations. Total nitrogen ($p=0.0004$) and total phosphorus ($p=0.0164$) showed significant difference ($p<0.05$) among stations. Total ammonium ($p=0.0001$), total nitrogen ($p=0.0000$), and orthophosphate ($p=0.0044$) indicated a significant difference ($p<0.05$) among these three samplings. Total phosphorus ($p=0.3184$) had shown that there was no significant difference ($p>0.05$) among the first, second and third samplings. Generally, the nitrogen concentration was higher than the phosphorus concentration throughout this study. The nitrogen and phosphorus value had increasing from the Southwest monsoon to Inter-Northeast monsoon and then to the Northeast monsoon season. The mean N:P ratio of sampling in Setiu Lagoon was 9:1. The N:P ratio in lagoon was lower than in the ocean of the world aquatic system. Setiu Lagoon had begun contaminating with nitrogen and phosphorus due to the increasing concentration from year 2004 to the present study.