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ในอ่าวคุ้งกระเบน ประเทศไทย



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**ECOLOGICAL STUDIES ON BENTHIC POLYCHAETES  
WITH RESPECT TO ORGANIC ENRICHMENT CONDITION  
IN KUNG KRABAE BAY, THAILAND**

Mr. Bamroonsak Chatanathawej

ศูนย์วิทยทรัพยากร

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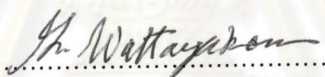
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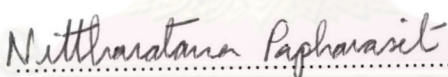
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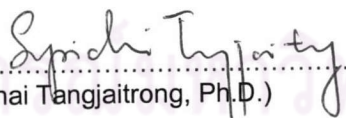
  
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บำรุงศักดิ์ ฉัตรอนันท์ทเวช: นิเวศวิทยาของไส้เดือนทะเลที่สัมพันธ์กับภาวะสารอินทรีย์ปริมาณสูงในอ่าวคุ้งกระเบน ประเทศไทย (ECOLOGICAL STUDIES ON BENTHIC POLYCHAETES WITH RESPECT TO ORGANIC ENRICHMENT CONDITION IN KUNG KRABAEEN BAY, THAILAND) อ. ที่ปรึกษา: รศ. ณีฐวรรธน์ ปภาวสิทธิ์, ผศ. ดร. อัจฉราภรณ์ เปี่ยมสมบูรณ์ และ อ. ดร.ศุภิชัย ตั้งใจตรง 250 หน้า ISBN 974-03-1000-1

การศึกษานี้มีวัตถุประสงค์ศึกษาการเปลี่ยนแปลงประชาคมสัตว์ทะเลหน้าดิน เน้นองค์ประกอบชนิด ความชุกชุมและมวลชีวภาพของไส้เดือนทะเลที่สัมพันธ์กับสภาพแวดล้อมสารอินทรีย์ปริมาณสูงในอ่าวคุ้งกระเบน นอกจากนี้ยังทำการศึกษาการใช้ประโยชน์ที่ดินเพื่อการเพาะเลี้ยงกุ้งทะเล ลักษณะอุทกวิทยาของน้ำในอ่าวโดยเฉพาะการแลกเปลี่ยนน้ำ ความเค็มและสารอาหารที่เกิดขึ้น โดยใช้แบบจำลองงบประมาณ (Budget Models) ในช่วงก่อนมีระบบชลประทานน้ำเค็ม และระยะหลังมีการใช้ระบบชลประทานน้ำเค็ม ผลการศึกษาจะสามารถนำไปใช้ในการประเมินผลกระทบจากสารอินทรีย์ปริมาณสูงจากกิจกรรมการเลี้ยงกุ้งได้

ผลการศึกษาได้บ่งชี้ถึงความสัมพันธ์ระหว่างพื้นที่เลี้ยงกุ้งกับการเพิ่มขึ้นของสารอาหารที่หมุนเวียนในอ่าวโดยเฉพาะปริมาณไนโตรเจนอนินทรีย์และอินทรีย์ ภาวะการเกิดการเพิ่มปริมาณอินทรีย์สาร (Eutrophication) ในอ่าวแปรผันกับพื้นที่การเลี้ยงกุ้ง ในช่วงก่อนมีระบบชลประทานน้ำเค็มนั้นอ่าวคุ้งกระเบนมีสภาพเป็น Autotrophic system โดยเฉพาะในฤดูแล้ง ในระยะหลังที่มีการใช้ระบบชลประทานน้ำเค็มแล้ว พบว่าอ่าวคุ้งกระเบนมีสภาพเป็น Heterotrophic system ทั้งในฤดูแล้งและฤดูฝน แสดงว่าโอกาสในการเกิดภาวะการเพิ่มปริมาณอินทรีย์สารในอ่าวคุ้งกระเบนลดลง เนื่องจากลักษณะการไหลเวียนของน้ำขึ้นกับอิทธิพลของน้ำขึ้นน้ำลงและลักษณะภูมิประเทศของอ่าว ที่มีป่าชายเลน หญ้าทะเลและอ่าวที่มีลักษณะเปิด นอกจากนี้ปริมาณสารอินทรีย์ลดต่ำลงในบริเวณตอนในอ่าว ส่วนปริมาณซิลิเกตพบมากในบริเวณคลองน้ำทิ้งจากนากุ้ง และบริเวณแนวหญ้าทะเล ไส้เดือนทะเลเป็นสัตว์ทะเลหน้าดินกลุ่มเด่นในบริเวณอ่าวคุ้งกระเบน โดยพบทั้งสิ้น 78 ชนิด จาก 27 วงศ์ ความแตกต่างของภาวะสารอินทรีย์ปริมาณสูงในอ่าวคุ้งกระเบน ทำให้เกิดความแตกต่างในชนิดของไส้เดือนทะเลที่พบ โดยสามารถแบ่งชุมชนไส้เดือนทะเลในอ่าวคุ้งกระเบนออกเป็นสองกลุ่มย่อยคือ กลุ่มไส้เดือนทะเลที่พบในสภาพแวดล้อมสารอินทรีย์ปริมาณสูงได้แก่ ไส้เดือนทะเลชนิด *Prionospio (Minuspio) japonica*, *Mediomastus* sp.A และ *Glycinde* sp.A ไส้เดือนทะเลกลุ่มนี้พบบริเวณคลองน้ำทิ้งจากนากุ้ง ส่วนกลุ่มที่สองประกอบด้วยไส้เดือนทะเลชนิด *Lumbrineris* sp.B, *Mediomastus* sp.A และ *Sigambra* cf. *tentaculata* ที่พบในบริเวณที่มีปริมาณอินทรีย์สารต่ำ โดยจากผลการศึกษาพบว่าไส้เดือนทะเลชนิด *Prionospio (Minuspio) japonica* สามารถใช้เป็นตัวบ่งชี้สภาพแวดล้อมสารอินทรีย์ปริมาณสูงได้

ผลการศึกษาครั้งนี้สรุปได้ว่า สถานภาพของอ่าวคุ้งกระเบน จังหวัดจันทบุรี ยังอยู่ในสภาพปกติ ยกเว้นในบริเวณคลองน้ำทิ้งจากนากุ้ง ที่แสดงสภาพแวดล้อมสารอินทรีย์ปริมาณสูง การที่พบไส้เดือนทะเลเป็นกลุ่มเด่นในประชาคมสัตว์ทะเลหน้าดินในบริเวณนี้ แสดงถึงสภาพแวดล้อมสารอินทรีย์ปริมาณสูงในบริเวณพื้นที่ท้องทะเล ดังนั้นการประเมินผลกระทบสภาพแวดล้อมควรมีการติดตามคุณภาพน้ำควบคู่กับการศึกษาการเปลี่ยนแปลงประชาคมสัตว์ทะเลหน้าดินด้วย

ภาควิชาวิทยาศาสตร์ทางทะเล  
สาขาวิชาวิทยาศาสตร์ทางทะเล  
ปีการศึกษา 2544

ลายมือชื่อนิสิต.....  
ลายมือชื่ออาจารย์ที่ปรึกษา.....  
ลายมือชื่ออาจารย์ที่ปรึกษาร่วม.....  
ลายมือชื่ออาจารย์ที่ปรึกษาร่วม.....



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KEY WORD: BENTHOS, POLYCHAETES, ORGANIC ENRICHMENT, SHRIMP FARMING, BUDGET MODELS, KUNG KRABAEN BAY, THAILAND.

**BAMROONGSAK CHATANANTHAWEJ: ECOLOGICAL STUDIES ON BENTHIC POLYCHAETES WITH RESPECT TO ORGANIC ENRICHMENT CONDITION IN KUNG KRABAEN BAY, THAILAND. THESIS ADVISORS: ASSOCIATE PROFESSOR NITTHARATANA PAPHAVASIT, ASSISTANT PROFESSOR AJCHARAPORN PIUMSOMBOON AND DR. SUPICHAJ TANGJAITRONG. 250 pp. ISBN 974-03-1000-1**

Ecological studies of benthic polychaetes with respect to organic enrichment condition in Kung Krabaen Bay, Chanthaburi Province, Thailand provided another alternative for impact assessment of organic enrichment due to shrimp farm effluents in this area. This study would focus on the changes in the benthic communities particularly species composition, abundance and biomass of polychaetes assemblage due to enriched organic materials in Kung Krabaen Bay. The study also provided the scenarios of the Kung Krabaen Bay in term of shrimp farm development and hydrological characteristics in particular the water, salt and nutrients models prior to the operation of seawater irrigation system and the first operational phase of the system in 1999.

The results showed the positive correlation between the number of shrimp ponds operated and the nutrient loading in drainage canals and the bay during the same period in particular the inorganic and organic nitrogen. According to the nutrient budget model revealed the level of eutrophication in the Kung Krabaen Bay system depended on the level of shrimp farm activities. The period before the seawater irrigation installation Kung Krabaen Bay was autotrophic especially in dry season. After the irrigation system installation, Kung Krabaen Bay is net heterotrophic in both seasons. The degree of eutrophication in the bay was reduced by the water circulation enforced by tidal actions and the geographic location flourished by mangrove forests, seagrass beds and open bay. However the high organic content found in the drainage canals and gradually low toward the bay. High content of hydrogen sulfide also associated with high mud content inside the drainage canals and in some areas of seagrass beds.

Polychaetes of 78 species from 27 families was the dominant group in the benthic communities of Kung Krabaen Bay. The gradients in organic content showed relationship with the polychaetes assemblage and opportunistic polychaete species. There were two distinctive polychaetes assemblages found in Kung Krabaen Bay. The first group was the benthic community associated with high organic content consisted of *Prionospio (Minuspio) japonica*, *Mediomastus* sp.A and *Glycinde* sp.A as the major species. They were common in mud and very fine sediment in the drainage canals and the mouth of canals. The latter group, consisted of *Lumbrineris* sp.B, *Mediomastus* sp.A and *Sigambra* cf. *tentaculata*, associated with low organic content sediment in the bay. A spionid polychaete, *Prionospio (Minuspio) japonica*, could be used as indicator species for moderated organic enrichment area.

It can be concluded that Kung Krabaen Bay was in normal condition with the exception of organic enrichment in the drainage canals. The dominance of polychaetes in the benthic communities reflected the organic enrichment condition in the bottom sediment. Thus the monitoring program on the environmental impacts in the bay should included the water quality and changes in the benthic communities.

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# CONTENTS

	PAGE
Abstract (in Thai).....	iv
Abstract (in English).....	v
Acknowledgements.....	vi
Contents.....	vii
List of Tables.....	ix
List of Figures.....	xiv
CHAPTER 1 INTRODUCTION.....	1
A. General Background.....	1
B. Establishment of the Kung Krabaen Bay Royal Development Study Center in Relation to Shrimp Farming.....	2
C. Conceptual Framework of Research.....	4
D. Objectives.....	6
E. Expected Results.....	7
F. Literature Reviews.....	8
1. Description of Study Site: Kung Krabaen Bay.....	8
2. Environmental Conditions of Kung Krabaen Bay.....	8
3. Impacts of Organic Enrichment on Benthic Communities.....	12
CHAPTER 2 MATERIALS AND METHODS.....	17
A. Scope of Research Activities.....	17
B. Landuse Analysis.....	17
C. Development of Budget Models.....	18
D. Analysis of Samples.....	18
E. Analysis of Data.....	21
CHAPTER 3 LANDUSE FOR SHRIMP FARMING.....	23
A. General Background.....	
1. Shrimp Farming in Chanthaburi Province.....	23
2. Geomorphology of Kung Krabaen Bay.....	23
3. Landuse in Kung Krabaen Bay.....	26
B. Expansion of Shrimp Farm Area Around Kung Krabaen Bay.....	28
1. Changes in shrimp farm area before 1981.....	28
2. Landuse of shrimp farming in 1981-1997 before the seawater irrigation system.....	29
3. Landuse for shrimp farming in 1999-2001 after the operation of seawater irrigation system.....	30
C. Relationship of Landuse for Shrimp Farming and Nutrient loading.....	30
D. Landuse for Urbanization.....	34
E. Discussion and Conclusion.....	34
CHAPTER 4 NUTRIENTS BUDGET MODELS OF KUNG KRABAEN BAY.....	37
A. Geography and Hydrography of Kung Krabaen Bay, Chanthaburi Province.....	37
1. Shrimp Culture in Kung Krabaen Bay.....	38
2. Meteorology of Kung Krabaen Bay, Chanthaburi Province.....	38
3. Physico-chemical Characteristics of Kung Krabaen Bay.....	39
B. Water and Salt Budgets.....	39
C. Nutrient balance and biogeochemical processes in Kung Krabaen Bay.....	41
D. Discussion and Conclusion.....	44
CHAPTER 5 PHYSICO-CHEMICAL CHARACTERISTIC OF KUNG KRABAEN BAY.....	47
A. Water Temperature.....	47
B. Salinity of water.....	50
C. Dissolved Oxygen at Water Bottom.....	52
D. Sediment Types.....	54
E. pH.....	82
F. Hydrogen Sulfide.....	84



G. Organic Matter.....	.87
H. Discussions and Conclusions .....	90
CHAPTER 6 BENTHIC COMMUNITY OF KUNG KRABAEN BAY.....	92
A. Macrobenthic Community Structure.....	92
1. Abundance of Macrobenthos.....	92
2. Biomass of Macrobenthos.....	95
B. Polychaete Assemblage.....	95
1. Diversity and Abundance of Polychaetes.....	95
2. Polychaetes Distribution.....	99
3. Dominant Species of Polychaete .....	141
4. Diversity Indices of Polychaetes.....	144
5. Polychaete Assemblage Structure.....	145
C. Relationship of Polychaetes and Environmental Parameters.....	150
D. Indicator Species of Organic Enrichment in Kung Krabaen Bay.....	152
E. Evaluation of Organic Enriched Benthic Communities.....	155
F. Discussions and Conclusions.....	158
1. Status of Macrobenthos Fauna of Kung Krabaen Bay.....	158
2. Organic Enriched Indicator Species in Kung Krabaen Bay.....	159
CHAPTER 7 POLYCHAETE DIVERSITY OF KUNG KRABAEN BAY.....	161
A. Background.....	161
B. Polychaete Diversity of Kung Krabaen Bay.....	161
C. Account of Species .....	164
Family Orbiniidae Hartman, 1942 .....	164
Family Paraonidae Cerruti, 1909.....	168
Family Cossuridae Day, 1963.....	171
Family Spionidae Grube, 1850.....	172
Family Magelonidae Cunningham and Ramage, 1888.....	189
Family Poecilochaetidae Hannerz, 1956 .....	191
Family Chaetopteridae Malmgren, 1867.....	192
Family Cirratulidae Carus, 1863.....	192
Family Capitellidae Grube, 1862 .....	195
Family Maldanidae Malmgren, 1867 .....	198
Family Ophelidae Malmgren, 1867 .....	200
Family Phyllodocidae Williams, 1851.....	202
Family Chrysopetalidae Ehlers, 1864 .....	204
Family Hesionidae Sars, 1862.....	204
Family Pilargidae Saint-Joseph, 1899.....	205
Family Syllidae Grube, 1850.....	207
Family Nereididae Johnston 1845.....	209
Family Glyceridae Grube, 1850 .....	210
Family Goniadidae Kinberg, 1866b.....	211
Family Lacydoniidae Bergstrom, 1914.....	211
Family Nephtyidae Grube, 1850.....	212
Family Amphinomididae Savigny, 1818.....	214
Family Lumbrineridae Malmgren, 1867.....	216
Family Sternaspidae Carus, 1863.....	217
Family Oweniidae Rioja, 1917 .....	218
Family Terebellidae Malmgren, 1867.....	219
Family Sabellidae Malmgren, 1867.....	221
D. Discussion and conclusion.....	222
CHAPTER 8 INTEGRATION OF RESULTS.....	226
A. Situation of Kung Krabaen Bay.....	226
B. Benthic Community of Kung Krabaen Bay.....	227
C. Suggestions.....	228
D. Conclusions.....	229
REFERENCES.....	231
BIOGRAPHY.....	239



## LIST OF TABLES

	PAGE
Table 1.1	Variations on number of shrimp farms, shrimp farm area and production in Chanthaburi Province from 1973 to 1998 (Department of Fisheries).....3
Table 1.2	Average content of nitrogen and phosphorus in terms of dry weight from various sources (Suthemechaikul and Wongsangcharn, 1995).....11
Table 2.1	Position of sampling stations in Kung Krabaen Bay, Chanthaburi Province by UTM grids during January – November, 2000.....20
Table 3.1	Land-use in Thamai District in 1975 (Dept. of Land Development, 1981).....23
Table 3.2	Estimation of shrimp farms area and annual shrimp production in Chanthaburi Province by District in October, 1990. (Chanthaburi Provincial Office and Department of Fisheries).....29
Table 3.3	Changes in shrimp farm area from 1981-2001 in the Kung Krabaen Bay, Chanthaburi Province..... 30
Table 3.4	The relationship between the changes in shrimp farm area and the average nutrient loadings from drainage canals and central part of the Kung Krabaen Bay, Chanthaburi Province during dry and wet season in 1997 - 2000.....32
Table 3.5	Nutrient budgets for 10-hectare shrimp ponds in term of the amounts of nitrogen and phosphorus in the feed input, shrimp output, and wasted loads (wastes expressed in two quantities). (Phillips, 1995).....35
Table 4.1	Average monthly evaporation and precipitation in Kung Krabaen Bay and its watershed area from 1994 to 2000 (dry season: November to April; wet season: May to October; unit: precipitation and evaporation in $\text{mm d}^{-1}$ )..... 38
Table 4.2	Averaged quantitative values of physico-chemical parameters at the Period before irrigation (in 1994-1998) and after (in 1998-2000) irrigation Installation in Kung Krabaen Bay and neighboring systems in wet and dry Season (modified from Kung Krabaen Bay Research Study Development Center, 1994-2000). Unit salinity in psu; nutrients in $\text{mol.m}^{-3}$ .....39
Table 4.3	Water and salt circulation parameters estimated from the water and salt budgets for Kung Krabaen Bay during the period before and after seawater irrigation system. ( $V_Q$ = water flow from shrimp ponds, $V_R$ = residual flow, $V_P$ and $V_E$ = volume of precipitation and evaporation, $V_X$ = water exchange rate; in $10^4 \text{ m}^3 \text{ d}^{-1}$ , $V_X(S_{\text{sea}} - S_{\text{sys}})$ = exchanged salt flux in $10^7 \text{ kg d}^{-1}$ and $\tau$ = water exchange time in day). ..... 40
Table 4.4	Fluxes of non-conservative materials (phosphorus and nitrogen) in dry and wet season of Kung Krabaen Bay at the period before (1994-2000) and after (1999-2000) irrigation installation. (unit in $\text{kg mol d}^{-1}$ )..... 42
Table 4.5	Net ecosystem metabolism ( $p-r$ ) and stoichiometric analysis (nfix-denit)for Kung Krabaen Bay (unit in $\text{m mol m}^{-2} \text{ d}^{-1}$ ). .....42
Table 5.1	Average temperature ( $^{\circ}\text{C}$ ) on the coastal stations outside Kung Krabaen Bay during dry (January-April) and wet (August-November) season, 2000..... 48
Table 5.2	Average salinity (psu) on the coastal stations outside Kung Krabaen Bay during dry (January-April) and wet (August-November) season, 2000.... 52
Table 5.3	Average dissolved oxygen (mg/l) on the coastal stations outside Kung Krabaen Bay during dry (January-April) and wet (August-November) season,2000.....54
Table 5.4	Grain size composition (%), median grain size ( $\phi$ ) and sediment type in Kung Krabaen Bay, Chanthaburi Province, during dry (January–April) season, 2000.....55



Table 5.5	Grain size composition (%), median grain size ( $\phi$ ) and sediment type in Kung Krabaen Bay, Chanthaburi Province, during wet (August–November) season, 2000.....	56
Table 5.6	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station In of Transect A among the sampling months.....	57
Table 5.7	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 5 of Transect A among the sampling months.....	58
Table 5.8	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 4 of Transect A among the sampling months.....	59
Table 5.9	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 3 of Transect A among the sampling months.....	60
Table 5.10	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 2 of Transect A among the sampling months.....	60
Table 5.11	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 2 of Transect A among the sampling months.....	61
Table 5.12	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station In of Transect B among the sampling months.....	62
Table 5.13	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 5 of Transect B among the sampling months.....	63
Table 5.14	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 4 of Transect B among the sampling months.....	64
Table 5.15	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 3 of Transect B among the sampling months.....	64
Table 5.16	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 2 of Transect B among the sampling months.....	65
Table 5.17	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 1 of Transect B among the sampling months.....	66
Table 5.18	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station In of Transect C among the sampling months.....	67
Table 5.19	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 5 of Transect C among the sampling months.....	68
Table 5.20	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 4 of Transect C among the sampling months.....	69
Table 5.21	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 3 of Transect C among the sampling months.....	70
Table 5.22	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 2 of Transect C among the sampling months.....	70
Table 5.23	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station In of Transect D among the sampling months.....	71
Table 5.24	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 5 of Transect D among the sampling months.....	72



Table 5.25	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 4 of Transect D among the sampling months.....	73
Table 5.26	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 3 of Transect D among the sampling months.....	74
Table 5.27	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 2 of Transect D among the sampling months.....	75
Table 5.28	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station In of Transect E among the sampling months.....	76
Table 5.29	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 5 of Transect E among the sampling months.....	76
Table 5.30	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 4 of Transect E among the sampling months.....	77
Table 5.31	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 3 of Transect E among the sampling months.....	78
Table 5.32	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 2 of Transect E among the sampling months.....	79
Table 5.33	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at Station 1 of Transect E among the sampling months.....	79
Table 5.34	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at control station C1 among the sampling months.....	80
Table 5.35	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at control station C2 among the sampling months.....	81
Table 5.36	Median grain size, type of sediment, sorting index and degree of sorting of sediment analysis at control station C3 among the sampling months.....	81
Table 5.37	Average pH on the coastal stations outside Kung Krabaen Bay during dry (January-April) and wet (August-November) season, 2000.....	84
Table 5.38	Average salinity (psu) on the coastal stations outside Kung Krabaen Bay during dry (January-April) and wet (August-November) season, 2000.....	85
Table 5.39	Mean average organic content (%) on the coastal stations outside Kung Krabaen Bay during dry (January-April) and wet (August-November) season, 2000.....	88
Table 6.1	Mean average and average number of polychaete family in wet and dry period.....	96
Table 6.2	Number of family and number of polychaete found in Kung Krabaen Bay Chanthaburi Province, during January – November, 2000.....	97
Table 6.3	List of families and species occurred in Kung Krabaen Bay, Chanthaburi Province, During January – November, 2000.....	98
Table 6.4	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect A in January 2000.....	101
Table 6.5	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect A in April 2000.....	103
Table 6.6	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect A in August 2000.....	104



Table 6.7	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect A in November 2000.....	105
Table 6.8	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling Stations of Transect B in January 2000.....	108
Table 6.9	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling Stations of Transect B in April 2000.....	110
Table 6.10	Account of polychaete species found in Kung Krabaen Bay and their average abundance (ind. m <sup>-2</sup> ) and percentile (%) among sampling station Transect B in August 2000.....	111
Table 6.11	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling Stations of Transect B in November 2000.....	113
Table 6.12	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling Stations of Transect C in January 2000.....	115
Table 6.13	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect C in April 2000.....	117
Table 6.14	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect C in August 2000.....	118
Table 6.15	Account of polychaete species found in the Kung Krabaen and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect C in November 2000.....	120
Table 6.16	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect D in January 2000.....	121
Table 6.17	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect D in April 2000.....	123
Table 6.18	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect D in August 2000.....	124.
Table 6.19	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect D in November 2000.....	126
Table 6.20	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect E in January 2000.....	128
Table 6.21	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect E in April 2000.....	130
Table 6.22	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect E in August 2000.....	132
Table 6.23	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of Transect E in November 2000.....	134
Table 6.24	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of control stations in January 2000.....	137
Table 6.25	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of control stations in April 2000.....	138



Table 6.26	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of control stations in August 2000.....	139
Table 6.27	Account of polychaete species found in the Kung Krabaen Bay and their average abundance (ind.m <sup>-2</sup> ) and percentile (%) among sampling stations of control stations in November 2000.....	140
Table 6.28	Average abundance (ind/core) of the top ten dominance species and dominance index in Kung Krabaen Bay during January – November 2000.....	141
Table 6.29	Average abundance (ind/core) of 3 sequence of dominance species from sampling sites inside canal, at mouth of canal, 500 m, 1000 m, 1500 m and 2000 m.....	143
Table 6.30	Sampling sites, dominant species and environmental parameters of group 1 and 2 from cluster analysis of Kung Krabaen Bay, Chanthaburi Province, in dry season.....	147
Table 6.31	Sampling sites, dominant species and environmental parameters of group 1 and 2 from cluster analysis of Kung Krabaen Bay, Chanthaburi Province, in wet season.....	149
Table 6.32	Correlation tests of environmental parameters, number of species, number of families and abundant polychaete species of Kung Krabaen Bay.....	151



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## LIST OF FIGURES

	Page
Figure 1.1	5
Figure 1.2	6
Figure 1.3	9
Figure 1.4	11
Figure 1.5	13
Figure 1.6	14
Figure 1.7	16
Figure 2.1	19
Figure 3.1	25
Figure 3.2	25
Figure 3.3	26
Figure 3.4	27
Figure 3.5	33
Figure 4.1	37
Figure 4.2	41
Figure 4.3	43
Figure 5.1	47
Figure 5.2	49
Figure 5.3	50
Figure 5.4	51
Figure 5.5	52
Figure 5.6	53
Figure 5.7	57



Figure 5.8	Grain size composition (%) at Station 5 of Transect A by sampling months .....	58
Figure 5.9	Grain size composition (%) at Station 4 of Transect A by 4 sampling months.....	59
Figure 5.10	Grain size composition (%) at Station 3 of Transect A by sampling months.....	59
Figure 5.11	Grain size composition (%) at Station TA 2 of Transect A by 4 sampling months .....	60
Figure 5.12	Grain size composition (%) at Station 1 of Transect A by sampling months .....	61
Figure 5.13	Grain size composition (%) by sampling months at Station In of Transect B.....	61
Figure 5.14	Grain size composition at Station 5 of Transect B among 4 sampling month: January, April, August and November.....	62
Figure 5.15	Grain size composition at Station 4 of Transect B among 4 sampling month: January, April, August and November.....	63
Figure 5.16	Grain size composition at Station 3 of Transect B among 4 sampling month: January, April, August and November.....	64
Figure 5.17	Grain size composition at Station 2 of Transect B among 4 sampling month: January, April, August and November.....	65
Figure 5.18	Grain size composition at Station 1 of Transect B among 4 sampling month: January, April, August and November.....	66
Figure 5.19	Grain size composition at Station In of Transect C among 4 sampling month: January, April, August and November.....	66
Figure 5.20	Grain size composition at Station 5 of Transect C among 4 sampling month: January, April, August and November.....	67
Figure 5.21	Grain size composition at Station 4 of Transect C among 4 sampling month January, April, August and November.....	68
Figure 5.22	Grain size composition at Station 3 of Transect C among 4 sampling month January, April, August and November.....	69
Figure 5.23	Grain size composition at Station 2 of Transect C among 4 sampling month January, April, August and November.....	70
Figure 5.24	Grain size composition at Station In of Transect D among 4 sampling month January, April, August and November.....	71
Figure 5.25	Grain size composition at Station 5 of Transect D among 4 sampling month January, April, August and November.....	72
Figure 5.26	Grain size composition at Station 4 of Transect D among 4 sampling month January, April, August and November.....	73
Figure 5.27	Grain size composition at Station 3 of Transect D among 4 sampling month January, April, August and November.....	73
Figure 5.28	Grain size composition at Station 2 of Transect D among 4 sampling month January, April, August and November.....	74
Figure 5.29	Grain size composition at Station In of Transect E among 4 sampling month January, April, August and November.....	75
Figure 5.30	Grain size composition at Station 5 of Transect E among 4 sampling month January, April, August and November.....	76
Figure 5.31	Grain size composition at Station 4 of Transect E among 4 sampling month January, April, August and November.....	77
Figure 5.32	Grain size composition at Station 3 of Transect E among 4 sampling month January, April, August and November.....	77
Figure 5.33	Grain size composition at Station 2 of Transect E among 4 sampling month January, April, August and November.....	78
Figure 5.34	Grain size composition at Station 1 of Transect E among 4 sampling month January, April, August and November.....	79
Figure 5.35	Grain size composition at control station C1 among 4 sampling month.. January, April, August and November.....	80
Figure 5.36	Grain size composition at control station C2 among 4 sampling month January, April, August and November.....	80



Figure 5.37	Grain size composition at control station C3 among 4 sampling months: January, April, August and November.....	81
Figure 5.38	Mean average pH value by stations in 4 sampling months: January, April, August and November.....	82
Figure 5.39	Average pH by stations in 4 sampling months: January, April, August and November 2000.....	83
Figure 5.40	Mean average AVS (mg/g) transects in Kung Krabaen Bay during dry and wet season, 2000.....	84
Figure 5.41	Average AVS (mg/g) by stations in 4 sampling months: January, April, August and November 2000.....	86
Figure 5.42	Mean average organic content (%) by transects in Kung Krabaen Bay during dry and wet season, 2000.....	87
Figure 5.43	Average organic content (%) by stations in 4 sampling months: January, April, August and November 2000.....	89
Figure 6.1	Average abundance composition of major 7 taxa in benthic community of the Kung Krabaen Bay by transects sampling during January – November 2000.....	93
Figure 6.2	Average biomass composition (%) of major 7 taxa in benthic community of the Kung Krabaen Bay by transects sampling during January – November 2000.....	94
Figure 6.3	Mean average number of polychaete family curves by stations among 4 sampling months: January, April, August and November.....	96
Figure 6.4	Diversity indices of polychaetes in Kung Krabaen Bay, Chanthaburi Province during January – November, 2000.....	144
Figure 6.5	Polychaete assemblage structure of Kung Krabaen Bay in dry season.....	146
Figure 6.6	Polychaete assemblage structure of Kung Krabaen Bay in wet season.....	148
Figure 6.7	Abundance and organic content plots showing the positive Relationship of <i>P. (Minuspio) japonica</i> to increasing organic content gradient.....	153
Figure 6.8	Abundance and organic content plots showing the relationship of <i>Mediomastus</i> sp.A to increasing organic content gradient.....	154
Figure 6.9	SAB curves relationship evaluating the organic enrichment from organic source at inner canals. Peak of opportunist (O.P.) occurred at the mouth of canals and the ecotone point (E) divided the benthic communities into 2 sub-communities at 700 m boundary in dry period and at 500 m boundary from organic source in wet period.....	155
Figure 6.10	Showing the levels of pollution in Kung Krabaen Bay during dry and wet season by ABC-plots followed Warwick (1986).....	157
Figure 7.1	<i>Scoloplos (Leodamus) sp.A</i> : A, Dorsal view and B, lateral view with thoracic neuropodial hooks.....	165
Figure 7.2	<i>Scoloplos (Scoloplos) marsupialis</i> Southern, 1921.....	166
Figure 7.3	<i>Scoloplos (ScolopLos) sp.A</i> .....	166
Figure 7.4	<i>Scoloplos (ScolopLos) sp.B</i> .....	167
Figure 7.5	<i>Tauberia gracilis</i> (Tauber, 1879).....	168
Figure 7.6	<i>Cirrophorus</i> sp.A.....	169
Figure 7.7	<i>Aricidea</i> cf. <i>fragilis</i> Webster, 1879.....	169
Figure 7.8	<i>Aricidea</i> sp.A.....	170
Figure 7.9	<i>Aricidea</i> sp.B.....	170
Figure 7.10	<i>Cossura</i> sp.A.....	171
Figure 7.11	<i>Pseudopolydora</i> sp.A.....	173
Figure 7.12	<i>Pseudopolydora</i> sp.B.....	173
Figure 7.13	<i>Pseudopolydora</i> sp.C.....	174
Figure 7.14	<i>Malacoceros indicus</i> (Fauvel, 1982).....	174
Figure 7.15	<i>Spiophanes</i> cf. <i>japonicum</i> Imajima, 1991.....	175
Figure 7.16	<i>Prionospio (Minuspio) japonica</i> Okuda, 1935.....	176
Figure 7.17	<i>Prionospio (Minuspio) pulchra</i> Imajima, 1973.....	177
Figure 7.18	<i>Prionospio (Minuspio) multibranchiata</i> Berkeley, 1927.....	178
Figure 7.19	Cf. <i>Prionospio (Minuspio) sp.A</i> .....	179



Figure 7.20	<i>Prionospio (Prionospio) caspersi</i> Laubier, 1962.....	180
Figure 7.21	<i>Prionospio (Prionospio) membranacea</i> Imajima, 1990.....	181
Figure 7.22	<i>Prionospio (Prionospio) depauperata</i> Imajima, 1990.....	182
Figure 7.23	<i>Prionospio (Prionospio) cf. nielsenii</i> Hylleberg & Nateewathana, 1991.....	183
Figure 7.24	<i>Prionospio (Prionospio) cf. malayensis</i> Caullery, 1914.....	184
Figure 7.25	<i>Prionospio (Aquilaspio) sexoculata</i> Augener, 1918.....	185
Figure 7.26	<i>Paraprionospio pinnata</i> Caullery, 1914.....	185
Figure 7.27	<i>Spio</i> sp.A.....	186
Figure 7.28	<i>Scolecopsis</i> sp.A.....	187
Figure 7.29	<i>Scolecopsis</i> sp.B.....	187
Figure 7.30	<i>Aonides</i> sp.A.....	188
Figure 7.31	<i>Magelona crenulifrons</i> Gallardo, 1968.....	189
Figure 7.32	<i>Magelona kamala</i> Nateewathana & Hylleberg, 1991.....	190
Figure 7.33	<i>Magelona pygmaea</i> Nateewathana & Hylleberg.....	190
Figure 7.34	<i>Poecilochaetus</i> sp.A.....	191
Figure 7.35	<i>Chaetopterus variopedatus</i> Renier, 1804.....	192
Figure 7.36	<i>Raricirrus</i> sp.A.....	193
Figure 7.37	<i>Cirriformia</i> sp.A.....	193
Figure 7.38	<i>Tharyx</i> sp.A.....	194
Figure 7.39	<i>Monticellina</i> sp.A.....	194
Figure 7.40	<i>Chaetozone</i> sp.A.....	195
Figure 7.41	<i>Notomastus latericeus</i> Sars.....	196
Figure 7.42	<i>Notomastus</i> sp.A.....	196
Figure 7.43	<i>Mediomastus</i> sp.A.....	197
Figure 7.44	<i>Capitella</i> sp.A.....	197
Figure 7.45	<i>Capitomastus</i> sp.A.....	198
Figure 7.46	<i>Euclymene</i> sp.A.....	199
Figure 7.47	<i>Clymenura</i> sp.A.....	199
Figure 7.48	<i>Armandia</i> cf. <i>lanceolata</i> Willey 1905.....	200
Figure 7.49	<i>Ophelina</i> cf. <i>acuminata</i> Oersted, 1843.....	201
Figure 7.50	<i>Polyophthalmus cf. pictus</i> (Dujardin, 1839).....	202
Figure 7.51	<i>Eteone</i> sp.A.....	203
Figure 7.52	<i>Genytyllis</i> sp.A.....	203
Figure 7.53	<i>Chrysopetalum</i> sp.A.....	204
Figure 7.54	<i>Leocrates</i> sp.A.....	205
Figure 7.55	<i>Ancistrosyllis</i> sp.A.....	206
Figure 7.56	<i>Sigambra</i> cf. <i>tentaculata</i> (Treadwell 1941).....	206
Figure 7.57	<i>Dentatisyllis</i> sp.A.....	207
Figure 7.58	<i>Pionosyllis</i> sp.A.....	208
Figure 7.59	Syllidae sp.A.....	209
Figure 7.60	<i>Neanthes</i> sp.A.....	209
Figure 7.61	<i>Glycera</i> sp.A.....	210
Figure 7.62	<i>Glycinde</i> sp.A.....	211
Figure 7.63	<i>Paralacydonia</i> sp.A.....	212
Figure 7.64	<i>Nephtys</i> sp.A.....	213
Figure 7.65	<i>Nephtys</i> sp.B.....	213
Figure 7.66	<i>Micronephthys sphaerocirrata</i> Wesenberg-Lund, 1949.....	214
Figure 7.67	<i>Linopherus</i> sp.A.....	215
Figure 7.68	<i>Chloeia</i> sp.A.....	215
Figure 7.69	<i>Lumbrineris</i> sp.B.....	216
Figure 7.70	<i>Lumbrineris</i> sp.C.....	217
Figure 7.71	<i>Ninoe</i> sp.A.....	217
Figure 7.72	<i>Sternaspis</i> sp.A.....	218
Figure 7.73	<i>Owenia</i> sp.A.....	218
Figure 7.74	<i>Myriochele</i> sp.A.....	219
Figure 7.75	<i>Pista</i> sp.A.....	220
Figure 7.76	<i>Terebellides stroemi</i> Sars, 1835.....	220
Figure 7.77	<i>Euchone</i> sp.A.....	222
Figure 7.78	<i>Chone</i> sp.A.....	222