

MANAGEMENT IN SOUTH OF TERENGGANU (KEMAMAN,  
DUNGUAN AND MARANG)

NURUL HUSNA BT. ZULKIFLI

FAKULTI SAINS DAN TEKNOLOGI  
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA  
2006



**MANGROVE IN SOUTH OF TERENGGANU (KEMAMAN, DUNGUN,  
MARANG)**

**By  
Nurul Husna Binti Zulkifli**

**Research Report submitted in partial fulfillment of  
the requirements for the degree of  
Bachelor of Applied Sciences (Biodiversity Conservation and Management)**

**Department of Biological Sciences  
Faculty of Science and Technology  
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA  
2006**

This project should be cited as:

Nurul Husna, Z. 2006. Mangrove In South Of Terengganu (Kemaman, Dungun and Marang). Undergraduate thesis, Bachelor of Applied Science in Biodiversity Conservation and Management, Faculty of Science and Technology, Kolej Universiti Sains dan Teknologi Malaysia, Terengganu. 81p.

No part of his project report may be produced by any mechanical, photographic, or electronic process. or in the form of phonographic recording, nor may it be stored in a retrieval system, transmitted, or otherwise copied for public or private use, without written permission from the author and the supervisor (s) of the project.



**JABATAN SAINS BIOLOGI  
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: MANGROVE IN SOUTH OF TERENGGANU (KEMAMAN, DUNGUN AND MARANG) oleh Nurul Husna binti Zulkifli, no. matrik: UK8093 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperoleh ijazah Sarjana Muda Sains (Pemuliharaan dan Pengurusan Biodiversiti), Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

Disahkan oleh:

Penyelia Utama

Nama:

Cop Rasmi:

**Kasawani Ibrahim**  
*Pensyarah*  
Jabatan Sains Biologi  
Fakulti Sains dan Teknologi  
Kolej Universiti Sains dan Teknologi Malaysia  
21030 Kuala Terengganu.

Tarikh:

7.5.06

Penyelia Kedua (jika ada)

Nama:

Cop Rasmi:

**PROF. MADYA SULONG BIN IBRAHIM**  
*Fellow*  
Institut Oseanografi  
Kolej Universiti Sains dan Teknologi Malaysia  
Mangabang Telipot  
21030 Kuala Terengganu.

Tarikh:

04.05.06

Ketua Jabatan Sains Biologi

Nama:

Cop Rasmi:

**PROF. MADYA DR. NAKISAH BT. MAT AMIN**  
*Ketua*  
Jabatan Sains Biologi  
Fakulti Sains dan Teknologi  
Kolej Universiti Sains dan Teknologi Malaysia  
(KUSTEM)  
21030 Kuala Terengganu.

Tarikh:

07.05.06

## ACKNOWLEDGEMENT

Alhamdulillah and praise to Allah Almighty for his blessing, which enabled me to complete this thesis. First and foremost, I would like to express my sincere gratitude and appreciation to my main supervisor, Mr. Kasawani Ibrahim for his invaluable guidance, advices and also criticisms throughout this study. My sincere thanks also go to my co supervisor, Associate Professor Sulong Ibrahim for his advices, guidance, and his useful comments.

I wish to express my special thanks to Mr. Nasir, Mr. Suffian and Mr. Azri for helping me with their ideas and support to complete this study excellently. I also would like to thanks Mr. Abdull Habir, Mr. Razali Salam for their expertise and experience that greatly has assisted me during the fieldwork and data collection

I would like to extend my very special thanks to my housemate, Lampir, Rox, and Erni, for rendered their help in sampling and for always be there for me when I needed most. Thank you so much to my companion partner Cik Pija and also to Mr. Dawood who have involved themselves in the course of my project, being here given me so much support, encourage, understanding and advice.

Last but not least, my gratitude to my beloved family for all the love, encouragement, moral and material support that has enable me to finish this project. Thank you so much.

## TABLE OF CONTENT

	<b>Page</b>
<b>ACKNOWLEDGEMENT</b>	ii
<b>TABLE OF CONTENT</b>	iii
<b>LIST OF TABLE</b>	vii
<b>LIST OF FIGURE</b>	viii
<b>LIST OF APPENDICES</b>	x
<b>ABSTRACT</b>	xi
<b>ABSTRAK</b>	xii
<b>CHAPTER 1 INTRODUCTION</b>	
1.1 Background	1
1.2 Justification	2
1.3 Objective	3
<b>CHAPTER 2 LITERATURE REVIEW</b>	
2.1 Definition of Mangrove	4
2.1.1 Species Identification	6
2.1.2 Mangrove Taxonomic	7
2.1.3 Traditional Uses of Mangrove Product	9
2.2 Productivity and Ecological Role	10
2.3 Importance of Mangrove Forest	13
2.4 Mangrove Forest Distribution	13
2.4.1 Mangrove in Malaysia	15

2.5	Mangrove Threat, Destruction, and Deforestation	17
2.6	Ground Truthing	19
2.7	Geographical Information System (GIS)	19
2.8	Forest Inventory	20
<b>CHAPTER 3 METHODOLOGY</b>		<b>22</b>
3.1	Study Area	25
3.2	Ground Sampling	28
3.2.1	Main Plot	28
3.2.2	Secondary Plot	28
3.2.3	Tertiary Plot	28
3.3	Observation	29
3.3.1	Interview	30
<b>CHAPTER 4 RESULT</b>		
4.1	Mangrove in Kemaman	31
4.1.1	Ground Data in Kemaman	32
4.1.2	Map of Mangrove Distribution in Kemaman	34
4.2	Mangrove in Dungun	43
4.2.1	Ground Data in Dungun	44
4.2.2	Map of Mangrove Distribution in Dungun	45
4.3	Mangrove in Marang	47
4.3.1	Ground Data in Marang	48
4.3.2	Map of Mangrove Distribution in Marang	49
4.3.3	Ground Data of Sungai Mercang	50



4.3.4	Map of Mangrove Distribution in Sungai Mercang	51
4.4	Self Observation	52
4.4.1	Sungai Senajang and Sungai Nyirih	52
4.4.2	Sungai Cabang	53
4.4.3	Sungai Sura	56
4.4.4	Sungai Gombang	58
4.4.5	Sungai Jara	58
4.4.6	Sungai Kuala Abang	59
4.4.7	Sungai Rinting	60
<b>5</b>	<b>DISCUSSION</b>	<b>63</b>
<b>6</b>	<b>CONCLUSION</b>	<b>70</b>
	<b>REFERENCES</b>	<b>71</b>
	<b>APPENDICES</b>	<b>74</b>
	<b>CURRICULUM VITAE</b>	<b>81</b>

## LIST OF TABLE

<b>Table</b>	<b>page</b>
2.1 Traditional Uses of Mangrove Product	9
2.2 Area of Mangrove Forests in Malaysia	16
2.3 Area of Mangrove Forests in Peninsular Malaysia	16
3.1 List of Topographical Maps	24
4.1a Mangrove Forest Type in Kemaman	32
4.1b Ground Data in Kemaman	33
4.2a Mangrove Species in Dungun	43
4.2b Ground Data in Dungun	44
4.3a Mangrove Species in Marang	47
4.3b Ground Data in Sungai Marang	48
4.3c Ground Data in Sungai Mercang	50
4.4a Ground Data in Sungai Cabang	54
4.4b Ground Data in Sungai Rinting	61

## LIST OF FIGURE

<b>Figure</b>		<b>Page</b>
2.1a	Leaf Shape of Mangrove Species	6
2.1b	Propagules of Mangrove Species	7
2.3	Mangrove Food Chain	12
2.4	World Mangrove Forest Distribution	15
3.1a	General Methodology Flow Diagrams	22
3.1b	Map of State in Terengganu	26
3.1c	Map of Study Area	27
3.3	Sampling Plot	29
4.1a	Map of Mangrove forest type along Sungai Kemasik	34
4.1b	Map of Mangrove forest type along Sungai Kertih and Paloh	35
4.1c	Map of Mangrove forest type along Sungai Batu Tampin	36
4.1d	Map of Mangrove forest type along Sungai Kijal	37
4.1e	Map of Mangrove forest type along Sungai Penunjuk	38
4.1f	Map of Mangrove forest type along Sungai Cukai	39
4.1g	Map of Mangrove forest type in Pulau Kucing	40
4.1h	Map of Mangrove forest type in Pulau Cik Wan Dagang	41
4.1i	Map of Mangrove forest type in Pulau Sekeping	42
4.2a	Map of Mangrove forest in Sungai Pimpin	45
4.2b	Map of Mangrove forest in Sungai Paka, Rengit and Dol	46
4.3a	Map of Mangrove forest in Sungai Marang	49
4.3b	Map of Mangrove forest in Sungai Mercang	51
4.4a	Strawberry Kijal Resort Apartment	52

4.4b	Non-exclusive Mangrove in Sungai Nyirih	53
4.4c	Mix Mangrove in Sungai Cabang	54
4.4d	Map of Mangrove forest in Sungai Cabang	55
4.4e	River Mouth of Sungai Sura	57
4.4f	<i>Lumnitzera racemosa</i> in Sungai Sura	57
4.4g	River Mouth of Sungai Kuala Abang	59
4.4h	Buai Beach Resort in sungai Rinting	61
4.4i	<i>Avicennia alba</i> Forest in Sungai Rinting	61
4.4j	Map of Mangrove forest in Sungai Rinting	62

## LIST OF APPENDICES

<b>Appendix</b>		<b>Page</b>
1	Mangrove Forest Reserve in Peninsular Malaysia	75
2	Form for Data Observation	76
3	Inventory Data Sheet	77
4	Formula for Data Calculation	78
5	Calculation for Area Coverage Each Radius in Plot	78

## ABSTRACT

The study of mangrove forest distribution was conducted in South of Terengganu. The study area that was covered is among the three districts in South of Terengganu, which are Kemaman, Dungun, and Marang. The objective is to provide the latest information about mangrove forest distribution, status and species compositions in south of Terengganu. Data was acquired and compiled from the previous study, ground survey, and observation. Ground sampling with circular plot design was conducted to get the density and dominance of the species. The total mangrove forest areas in these three districts are approximately 1881.78 ha. Kemaman covered the highest mangrove forest areas with 1485 ha followed by Dungun with 254.28 ha and Marang with 142.5 ha. Terengganu mangrove forest are less manageable and concern due to lack of mangrove management plan by the Forestry Department. From ground survey and observation of eight selected rivers, only two rivers that contain exclusive mangrove forest which are Sungai Cabang and Sungai Rinting. The differences between mangrove forest at south of Terengganu and other places have been discussed in chapter 5. Other issues that have been discussed in chapter 5 are zonation, destruction and development of mangrove areas, and closed river mouth that disturbed the natural condition in mangrove. For conclusion, mangroves forest in south of Terengganu are less manageable and concern so it was suggested to have an urgency management plan for mangroves resources.

## **TABURAN HUTAN PAYA LAUT DI SELATAN TERENGGANU (KEMAMAN, DUNGUN DAN MARANG)**

### **ABSTRAK**

Kajian mengenai taburan hutan paya bakau telah dilakukan di selatan Terengganu. Kawasan kajian adalah di tiga daerah selatan Terengganu iaitu Kemaman, Dungun, dan Marang. Objektif kajian ini ialah untuk menyediakan maklumat terkini mengenai taburan hutan paya bakau, status dan komposisi spesis di selatan Terengganu. Maklumat telah diperolehi dan digabungkan daripada kajian terdahulu yang telah dilakukan, tinjauan, dan pemerhatian ke atas kawasan kajian. 'Ground sampling' dengan menggunakan plot bulatan dilakukan untuk mengetahui kepadatan dan kelimpahan spesis. Jumlah kawasan hutan paya bakau di ketiga-tiga daerah ini ialah kira-kira 1881.75 ha. Kemaman mempunyai hutan paya bakau yang paling luas dengan 1485 ha, diikuti oleh Dungun dengan 254.28 ha dan Marang dengan 142.5 ha. Hutan paya bakau di Terengganu adalah kurang terurus dan mendapat perhatian akibat daripada kurangnya rancangan pengurusan oleh Jabatan Hutan. Daripada tinjauan dan pemerhatian ke atas lapan batang sungai, hanya dua sungai yang mengandungi hutan paya bakau spesis eksklusif iaitu Sungai Cabang dan Sungai Rinting. Perbezaan di antara hutan paya bakau di selatan Terengganu dengan di tempat-tempat lain telah dibincangkan dalam Bab 5. Isu lain yang telah dibincangkan dalam Bab 5 ialah zonasi, kemusnahan dan pembangunan di kawasan paya bakau, dan muara sungai yang tertutup yang mengganggu keadaan semulajadi hutan paya laut. Secara kesimpulannya, hutan paya bakau di selatan Terengganu adalah kurang pengurusan dan perhatian oleh itu adalah dicadangkan supaya rancangan pengurusan bagi sumber paya bakau perlu dilakukan dengan segera.