

A STUDY OF MARINE DEBRIS ALONG A BEACH AT KERTEH AREA

MOHD HAFIZ BIN PURHANUDIN

FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
UNIVERSITI MALAYSIA TERENGGANU

2011

7/11: 8588

1100088816



LP 16 FMSM 2 2011



1100088816

A study of marine debris along a beach at Kerteh area / Mohd Hafiz Purhanudin.

PERPUSTAKAAN SULTANAH NUR ZAHIRAH
UNIVERSITI MALAYSIA TERENGGANU (UMT)
21030 KUALA TERENGGANU

1100088816

1100088816		

Lihat sebelah

HAK MILIK
PERPUSTAKAAN SULTANAH NUR ZAHIRAH UMT

A STUDY OF MARINE DEBRIS ALONG A BEACH AT KERTEH AREA

By

Mohd Hafiz Bin Purhanudin

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

**Department of Marine Science
Faculty of Maritime Studies and Marine Science
UNIVERSITI MALAYSIA TERENGGANU
2011**

This project report should be cited as:

Hafiz P., M. 2011. A Study Of Marine Debris Along A Beach At Kerteh Area.
Undergraduate thesis, Bachelor of Science (Marine Science), Faculty of
Maritime Studies and Marine Science, Universiti Malaysia Terengganu,
Terengganu. 63p

No part of this project report may be reproduced 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.

16
Hafiz
2
2011



DECLARATION AND VERIFICATION REPORT

RESEARCH PROJECT I AND II

It is hereby declared and verified that this research report entitled:

A STUDY OF MARINE DEBRIS ALONG A BEACH AT KERTEH AREA by **MOHD HAFIZ PURHANUDIN**, Matric No. **UK 16566** have been examined and all errors identified have been corrected. This report is submitted to the Department of Marine Science as partial fulfillment towards obtaining the **Bachelor Degree of Science (Marine Science)**, Faculty of Maritime Studies and Marine Science, Universiti Malaysia Terengganu.

Verified by:

Principal Supervisor

Name: **CIK ZAHAITUN MAHANI BT ZAKARIAH**

Official stamp:

Date: 27/4/11

CIK ZAHAITUN MAHANI BINTI ZAKARIAH
Lecturer
Department of Maritime Management
Faculty of Maritime Studies and Marine Science
Universiti Malaysia Terengganu (UMT)
.....21030 Kuala Terengganu.....

Second Supervisor

Name: **DR. RAZAK ZAKARIYA**

Official stamp:

Date: 29/4/11

DR. RAZAK ZAKARIYA
Ketua Jabatan Sains Marin
Fakulti Pengajian Maritim dan Sains Marin
Universiti Malaysia Terengganu
(UMT)

Head of Department of Marine Science

Name: **DR. RAZAK ZAKARIYA**

Official stamp:

Date: 29/4/11

DR. RAZAK ZAKARIYA
Ketua Jabatan Sains Marin
Fakulti Pengajian Maritim dan Sains Marin
Universiti Malaysia Terengganu
(UMT)

ACKNOWLEDGEMENTS

Praise Allah S.W.T for giving me strength and lending knowledge which required for finishing this project in the given time frame.

First, millions of thanks to my supervisors, Cik Zahaitun Mahani bt Zakariah and Dr Razak b Zakariya who had given me the opportunity to pursue my final year project under their guidance.

Secondly, thanks to everyone who had involved directly in this project. During the sampling in Kerteh under the lead of Effi and Yuzwan who had lent their expert experience as well as Sainol, Syed, Naim, and Matzan. Thanks also to helpful hands from individuals involved indirectly, especially from Faiz Jaya, Bulloh, Naufal, Haqim, Syaibul, Nik Mat, Awang Azizi and others.

Thirdly, thanks to my FYP's team who had given me the morale supports and meaningful advices in hard time, especially Ahmad Shariy, Mohd Razlan and Nurul Akma. I would like to take this opportunity to appreciate all Marine Science batch 2008 for the meaningful 3 whole years we had spent together. Special credits also given to Rzyan for her guidance in this research starting from proposal writing until this project had become a masterpiece.

Last but not least is to my lovely family including my special girlfriend Wan Khadijah bt Wan Ismail, who had always pray for my success. It was not an easy task to complete this project, and thanks for all those prayers; I finally made it through, successfully.

If I would have to meet every person involved in this project and acknowledge them, I would like to say *"I would thank you from the bottom of my heart, but for you my heart has no bottom"*. Thank you once again, everyone.

-hafizjemba-

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	ii
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATION	viii
LIST OF APPENDICES	ix
ABSTRACT	x
ABSTRAK	xi
1.0 INTRODUCTION	
1.1 Introduction	1-2
1.2 Objectives.	3
2.0 LITERATURE REVIEW	
2.1 Definition of marine debris	4
2.2 Sources of debris.	4-6
2.3 Classification of debris	6-7
2.4 Related research	8-9
2.5 Impact of marine debris	
2.5.1 Impacts on marine animals	9-11
2.5.2 Impacts on human	11-13
2.5.3 Impacts on economic and aesthetic	13-15
2.5.4 Impacts on safety	15-16
2.6 Debris circulation in marine environment	16-17
2.7 Importance of marine debris monitoring programme	17-18
3.0 METHODOLOGY	
3.1 Study site	19
3.1.1 Study site location criteria	20
3.2 Marine debris collecting method	20-21
3.2.1 Safety and well being	22

	3.2.2	Setting up the survey sites	22-23
	3.2.3	Debris collection	24
	3.2.4	Processing and recording the debris	25
	3.2.5	Datasheet filling	26
3.3		Beach profile method	27
	3.3.1	Transect set up	27
	3.3.2	Point reading	27
	3.3.3	Data analyzing	28
4.0		RESULTS	
4.1		Mean composition of debris collected	29
	4.1.1	Mean composition of debris in each strandline division according monsoon season	29-30
	4.1.2	Mean weight of debris in each monsoon season.	31
4.2		Percentage abundance of marine debris components according to strandline	32
4.3		Origin of debris collected	33-34
	4.3.1	Origin of debris according to monsoon season in each strandline	33-34
4.4		Summary of percentage abundance of total debris collected	35
4.5		Summary of origin total debris collected	36
4.6		The wind speed and wind direction during the Sampling	37
4.7		Beach profile measurement	38
4.8		Correlation and relationship between components of debris and environmental parameters	39
	4.8.1	Correlation between slope and components of marine debris	40
5.0		DISCUSSION	
5.1		Composition of debris collected	41
	5.1.1	Composition of debris before and after monsoon season	41-42
	5.1.2	Composition of debris collected according to strandline	42-44
5.2		Origin of debris collected	44
5.3		The wind speed and wind direction during sampling	45
5.4		The beach profile measurement	45
5.5		Correlation between environmental factors and debris distribution	45
	5.5.1	Correlation between slope and debris distribution	46

6.0	CONCLUSION AND RECOMMENDATION	
6.1	Conclusion and recommendation	47-48
	REFERENCES	49-51
	APPENDIXES	52-62
	CURRICULUM VITAE	63

LIST OF TABLES

Table	Page
2.1 Types of debris with activities and source	7
4.1 Categories of correlation between parameters	39

LIST OF FIGURES

Figure	Title	Page
3.1a	Map of Terengganu, peninsular Malaysia	19
3.1b	Map of Kerteh beach, Terengganu	19
3.2	Flow chart of methodology	21
3.3	Beach profile and survey limits	23
3.4	Minimum size of debris to be collected	24
3.5	Minimum size of net to be recorded	26
3.6	Flow chart of beach profile method	27
4.1a	Mean composition of debris in each strandline division before monsoon season	29
4.1b	Mean composition of debris in each strandline division after monsoon season	30
4.2	Mean weight of debris in each strandline according to monsoon season	31
4.3	Percentage abundance of marine debris components in each strandline	32
4.4a	Origin of debris in each strandline after monsoon season	33
4.4b	Origin of debris in each strandline before monsoon season	34
4.5	Percentage abundance of debris collected	35
4.6	Percentage of origin debris collected	36
4.7	The wind direction (heading to) for first sampling and second sampling	37
4.8	Beach slope for 1st and 2nd sampling	38

LIST OF ABBREVIATIONS

\$	-	Dollar
£	-	Pound sterling
US	-	United States
UK	-	United Kingdom
m	-	Meter
N	-	North
E	-	East
eg.	-	Example
L	-	Liter
PVC	-	Polyvinyl chloride
GPS	-	Global positioning system
kg	-	Kilogram

LIST OF APPENDICES

Appendix		Page
A	Marine debris survey form (Rubbish on our shores and at sea excluding nets)	52
B	Marine debris survey form (Rubbish on our shores and at sea	53
C	Marine debris survey form (origins)	54
D	Barcode form	55
E	Marine debris survey (fishing nets only)	56
F	Marine debris survey (Display form for nets only)	57
G	Correlation between elevation of beach (slope) and debris after monsoon season	58
H	Correlation between elevation of beach (slope) and debris before monsoon	59
I	Examples of marine debris with barcode collected	60

ABSTRACT

A study was conducted in a beach at Kerteh, Terengganu to gain knowledge about marine debris since marine debris is one of the pollution that are becoming serious recently. There are two objectives focused on the study which the first one is to determine the volume, composition and origin of marine debris. The second objective is to know the relation between beach profile with debris distribution. The sampling area chosen for the study is at a sandy beach which is situated at the southern part of Terengganu in the South China Sea. It involving a beach with length 800m. There are two main task done there which are marine debris collecting and beach profile measurement. The sampling was conducted in two period of month. First sampling is on April where the after monsoon season and second sampling is on October (before monsoon season). The chosen of this time is because of to make the comparison of marine debris between before and after monsoon season. The study shown there have a big different amount of debris found during before and after monsoon season which the after monsoon's debris collected is higher. Other than that, it also showed that most of the debris was drifted to the beach by seawater and plastic is the most type of debris collected. There are also showed the relationship between slope of beach and the distribution of debris. By referring to the barcode label on some debris, it showed the manufacturer of debris found. Since marine debris can give bad effect to life especially marine animals and environment, so it is very important for every body to take a part in order to reduce the debris.

KAJIAN TENTANG SISA MARIN DI KAWASAN PANTAI, KERTEH

ABSTRAK

Satu kajian telah dijalankan di pantai di Kerteh, Terengganu untuk meningkatkan pengetahuan dalam bidang sisa marin berikutan ianya merupakan salah satu daripada punca pencemaran yang semakin serius baru-baru ini. Kajian ini menumpukan kepada dua objektif iaitu pertamanya untuk mengetahui isipadu, taburan dan asal sisa marin yang terdapat di kawasan kajian. Kedua ialah untuk mengetahui hubungkait di antara kecerunan pantai dengan taburan sisa marin. Kawasan kajian ini adalah bertempat di kawasan pantai berpasir di Kerteh, iaitu bahagian selatan di Negeri Terengganu yang berhadapan dengan laut China Selatan. Kajian ini melibatkan satu kawasan pantai sepanjang 800 meter. Terdapat dua aktiviti yang dilakukan dalam kajian ini iaitu pengutipan sisa marin dan pengukuran pantai. Kajian ini dijalankan pada dua bulan iaitu pada bulan April (selepas monsun) dan Oktober (sebelum monsun). Kajian yang dilakukan menunjukkan terdapat sejumlah perbezaan yang besar bagi jumlah sisa marin yang dijumpai pada kedua-dua tempoh tersebut dan jumlah ketika selepas monsun adalah lebih tinggi. Ia juga telah menunjukkan bahawa kebanyakan sisa marin dihanyutkan ke pantai oleh air laut. Selain itu, kebanyakan sampah juga adalah dari jenis plastic. Kajian juga telah menunjukkan bahawa terdapat hubungkait yang kuat di antara kecerunan pantai dan taburan sisa marin. Dengan merujuk kepada label kodbar pada sesetengah sisa marin, kebanyak sisa marin adalah dihasilkan di Malaysia. Memandangkan sisa marin memberi kesan buruk pada kehidupan terutamanya kepada hidupan marin dan persekitaran, adalah menjadi satu kepentingan bagi setiap individu untuk mengambil bahagian dalam mengurangkan pembuangan sisa dan membuang secara berhemah.