STATUS OF SEA TURTLE RESOURCES AND CORAL REEFS OF MALIANGIN ISLAND SANCTUARY, KUDAT, SABAH, MALAYSIA

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THESIS SUBMITTED IN FULFILLMENT FOR THE DEGREE OF MASTER OF SCIENCE

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ABSTRACT

STATUS OF SEA TURTLE RESOURCES AND CORAL REEFS OF MALIANGIN ISLAND SANCTUARY, KUDAT, SABAH, MALAYSIA

Maliangin Island Sanctuary (MIS), Kudat, Sabah was chosen as a model site for the future management of the Proposed Tun Mustapha Park. Research was conducted to collect baseline data on beach characteristics where green (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) sea turtles nest sporadically. Potential food resources for the sea turtles and the status of coral reefs at Maliangin Island Sanctuary were also assessed. The nesting beaches were divided into “frequent nesting” and “seldom nesting” stations where beach profile, ambient parameters, grain sizes of the beach and turtle egg chambers were determined. Three indicator fish families and bottom substrate coverage were used to assess the status of coral reefs. Results showed that beach profile, sand grain size and environmental conditions did not influence the selection of sea turtle nesting sites. Seagrass (main diet of greens) coverage and density of sponges (main diet of hawksbills) were calculated. The study area may not have high potential as feeding grounds for the turtles due to the lack of actual cropping sightings during underwater surveys. There were six seagrass species present but coverage was low (7%) whereas only 4 of the 25 genera of sponges had bite marks. Average values of live coral cover (46.8%), morphological diversity index (2.5), mortality index (0.13), condition index (0.37), development index (0.32) and succession index (-0.62) showed that the reefs of MIS were categorised as good condition and good development but with very poor succession. The 49 species of damselfishes (Pomacentridae), 8 species of butterflyfishes (Chaetodontidae) and 11 species of groupers (Serranidae) indicate that the hard corals in the study area were complex, healthy (live corals > dead corals) and that the reefs are rugose, respectively. Maliangin Island Sanctuary is rich with marine resources and with proper management, it can be utilised in multiple ways (livelihood of locals, ecotourism and aquaculture).
ABSTRAK

Santuari Pulau Maliangin, Kudat, Sabah telah dipilih sebagai tapak contoh untuk pengurusan Taman Cadangan Taman Tun Mustapha. Kajian telah dijalankan untuk mendapatkan data asas ciri-ciri pantai peneluran di mana pendaratan penyu hijau (Chelonia mydas) dan penyu sisik (Eretmochelys imbricata) adalah agak kurang. Sumber makanan potensi untuk penyu-penyu dan status terumbu karang di Santuari Pulau Maliangin juga telah ditaksirkan. Pantai peneluran telah dibahagikan kepada stesen-stesen “kerap bertelur” dan “jarang bertelur” di mana profil pantai, parameter sekeliling, saiz butiran pasir pantai dan pasir lubang sarang penyu telah ditentukan. Tiga famili ikan penunjuk dan liputan substrat dasar telah digunakan untuk menaksir status terumbu karang. Keputusan menunjukkan bahawa profil pantai, saiz butiran pasir dan keadaan sekeliling tidak mempengaruhi pemilihan kawasan bertelur penyu. Liputan rumput laut (diet utama penyu hijau) dan kepadatan span (diet utama penyu sisik) telah dihitungkan. Kawasan kajian mungkin tidak mempunyai potensi yang tinggi sebagai kawasan pemakanan untuk penyu-penyu disebabkan oleh ketiadaan penyu meragut diperhatikan ketika aktifiti penyelaman dijalankan. Terdapatnya enam spesies rumput laut tetapi liputan adalah rendah (7%) manakala hanya 4 daripada 25 genera span mempunyai tanda gigitan. Nilai purata liputan karang hidup (46.8%), kepelbagaian morfoliti terumbu karang (2.5), indeks kematian (0.13), indeks keadaan (0.37), indeks pertumbuhan (0.32) dan indeks sesaran (-0.62) menunjukkan bahawa terumbu karang di Santuari Pulau Maliangin adalah dikategorikan sebagai berkeadaan baik, pertumbuhan baik tetapi dengan sesaran yang tidak baik. Sebanyak 49 spesies ikan bombin (Pomacentridae), 8 spesies ikan bagang (Chaetodontidae) dan 11 spesies ikan kerapu (Serranidae) menunjukkan bahawa terumbu karang di kawasan kajian adalah kompleks, sihat (karang hidup > karang mati) dan kedut, masing-masing. Santuari Pulau Maliangin adalah kaya dengan sumber laut dan dengan pengurusan yang sewajarnya, ia boleh digunakan dengan pelbagai cara (mata pencarian tempatan, perlancongan dan akuakultur).
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE</td>
<td>i</td>
</tr>
<tr>
<td>DECLARATION</td>
<td>ii</td>
</tr>
<tr>
<td>CERTIFICATION</td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iv</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>v</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF CONTENTS</td>
<td>vii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>x</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xii</td>
</tr>
<tr>
<td>LIST OF PLATES</td>
<td>xvii</td>
</tr>
<tr>
<td>LIST OF EQUATIONS</td>
<td>xviii</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>xix</td>
</tr>
<tr>
<td>LIST OF APPENDICES</td>
<td>xxi</td>
</tr>
</tbody>
</table>

## CHAPTER 1: INTRODUCTION

1.1 Introduction
1.2 Status of Sea Turtles
  1.2.1 Nesting Beaches
  1.2.2 Foraging Grounds
1.3 Status of Coral Reefs
1.4 Significance of Study
1.5 Objectives of Study

## CHAPTER 2: LITERATURE REVIEW

2.1 Sea Turtles
  2.1.1 Green Turtles (Chelonia mydas)
  2.1.2 Hawksbill Turtles (Eretmochelys imbricata)
  2.1.3 Nesting Beach Assessments
  2.1.4 Nesting Beach Characteristics
  2.1.5 Egg Chamber Sand Characteristics
  2.1.6 The Roles of Green and Hawksbill Turtles
  2.1.7 Diet Selection
  2.1.8 Threats and Human Interactions
2.2 Coral Reef Ecosystem
2.2.1 Coral Reef Status in Sabah
2.2.2 Fish as Reef Indicators
   a. Damselfish (Pomacentridae)
   b. Butterflyfish (Chaetodontidae)
   c. Grouper (Serranidae)
2.2.3 Natural and Anthropogenic Threats to Coral Reefs
2.2.4 Conserving the Reef

CHAPTER 3: METHODOLOGY
3.1 Study Area
3.2 Sampling Methods
   3.2.1 Habitat Surveys for Sea Turtles
      a. Nesting Habitat Survey
         i. Beach Profiling
            • Statistical Analysis for Beach Profile
         ii. Beach Grain Size Analysis
            • Dry Sieving
            • Statistical Parameters for Grain Size Analysis
            • Statistical Analysis for Beach Grain Size Analysis
         iii. Littoral Environment Observation (LEO)
            • Statistical Analysis for LEO
         iv. Turtle Egg Chamber Grain Size Analysis
            • Statistical Analysis for Turtle Egg Chamber Grain Size Analysis
      b. Foraging Habitat Survey
         i. Transect and Quadrat Method for Seagrass Coverage
            • Statistical Analysis for Seagrass Coverage
         ii. Linear Transects (LT) for Density of Sponges
            • Statistical Analysis for Linear Transects
   3.2.2 Coral Reef Communities
      a. Line Intercept Transect (LIT)
         i. Major Benthic life-form
         ii. r-K-S Ternary Diagram
         iii. Statistical Analysis for LIT
      b. Underwater Visual Census (UVC) for Reef Fish Indicators
         i. Statistical Analysis for Reef Fish Indicators

CHAPTER 4: RESULTS
4.1 Preliminary Survey – Interview
4.2 Nesting Habitat Survey
   4.2.1 Beach Profiling
   4.2.2 Beach Grain Size Analysis
   4.2.3 Littoral Environment Observation (LEO)
   4.2.4 Turtle Egg Chamber Grain Size Analysis
4.3 Foraging Habitat Survey
   4.3.1 Transect and Quadrat for Seagrass Coverage
   4.3.2 Linear Transects (LTs) for Density of Sponges
4.4 Coral Reef Communities
LIST OF TABLES

Table 2.1  Average live and dead coral coverage (in percentage) at selected sites in Sabah. 42

Table 3.1  Classes of dominance used to record cover. 69

Table 3.2  Semi-qualitative scale for the assessment index in three corresponding forms, percentage, ratio and scale form. 73

Table 4.1  General description of all “frequent nesting” and “seldom nesting” beach profile stations at MIS. 86

Table 4.2  LEO data recorded across all 14 stations surveyed. 89

Table 4.3  Statistical parameters for beach grain size analysis. 99

Table 4.4  The minimum, maximum and mean values of six parameters measured from Littoral Environment Observation (LEO). 100

Table 4.5  Statistical parameters for turtle egg chamber grain size analysis. 105

Table 4.6  Mean percentage of seagrass coverage data. The alphabets: A, B and C represents the replicate transects conducted for seagrass stations (SG). 112

Table 4.7  Mean dominant seagrass species coverage at all seagrass stations. The alphabets: A, B and C represents the replicate transects conducted for seagrass stations (SG). 113

Table 4.8  Abundance and distribution of all sponges across all LT transects. Numbers represent the total quantity of sponges whereas the numbers in parenthesis represent the quantity of sponges with bite marks. 115

Table 4.9  Densities of both edible and total sponges across all LT transects. The numbers in the table indicates the densities of sponges in unit x10^3 m^2. Numbers represent the total density of sponges whereas the numbers in parenthesis represent the density of sponges with bite marks. 116

Table 4.10  Mean percentage cover of major benthic life-forms at all nine stations. 120

Table 4.11  Condition index (CI), development index (DI) and succession index (SI) at all nine stations. 122
Table 4.12 Percentages of ruderals (r), competitor (K), stress tolerators (S) and conservation class number for all nine stations.

Table 4.13 Morphological diversity index (mH'), mortality index (MI) and percentage live coral cover (LCC), at all nine stations.

Table 4.14 Mean values of morphological diversity index, mortality index and percentage live coral cover according to conservation class scores (mean ± s.d.).

Table 4.15 List of all identified reef fish indicators and their locations found.
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Relationships between physical characteristics of Ascension beaches and nesting density. Some beaches have more than one of the characteristics and thus are included in more than one category. Brackets indicate standard deviation.</td>
<td>24</td>
</tr>
<tr>
<td>2.2</td>
<td>Relationships between combinations of beach characteristics and nesting density at Ascension Island. Each bar represents one beach.</td>
<td>24</td>
</tr>
<tr>
<td>2.3</td>
<td>Relationship between sorting coefficients and mean particle diameters (mm) at each of the 65 beaches examined around the world. Biogenic beaches are indicated by closed circles and volcanic or pyrogenic beaches by open stars.</td>
<td>26</td>
</tr>
<tr>
<td>2.4</td>
<td>Relationships between the mean emergence success of clutches at 15 Ascension beaches and the sorting coefficients and mean particle diameters (mm) of the sands at those beaches.</td>
<td>27</td>
</tr>
<tr>
<td>3.1</td>
<td>Maliangin Kecil (left) and Maliangin Besar (right) Islands.</td>
<td>58</td>
</tr>
<tr>
<td>3.2</td>
<td>Summary diagram of methodology.</td>
<td>59</td>
</tr>
<tr>
<td>3.3</td>
<td>Station numbers for beach profile (BP) and turtle nesting (TN) stations. Solid stars (★) represent the “frequent nesting” stations while circles (○) represent the “seldom nesting” stations for sea turtles.</td>
<td>61</td>
</tr>
<tr>
<td>3.4</td>
<td>Station numbers for seagrass (SG) stations. Solid stars (★) represent stations that were studied. “Site A” represented in circle (○) was not studied because there were no seagrass in the area during the study period.</td>
<td>68</td>
</tr>
<tr>
<td>3.5</td>
<td>Schematic representation of sampling method for seagrass survey.</td>
<td>68</td>
</tr>
<tr>
<td>3.6</td>
<td>Station numbers for Line Intercept Transect (LIT) and Linear Transect (LT) stations. Solid stars (★) represent the location of stations.</td>
<td>70</td>
</tr>
<tr>
<td>3.7</td>
<td>Idealised r-K-S ternary diagram for coral reef conservation classes.</td>
<td>74</td>
</tr>
</tbody>
</table>
Figure 4.1 Map of Maliangin Island Sanctuary showing the
topographical distribution of landmark and marine ecosystems.

Figure 4.2 The distribution of sea turtle nests across all stations. Grey
and white bars in the graph represent the nests for green
turtles and hawksbill turtles, respectively.

Figure 4.3 Combination of all nine turtle nesting beach profiles in
Maliangin Besar Island.

Figure 4.4 Combination of all five turtle nesting beach profiles in
Maliangin Kedl Island.

Figure 4.5 Combination of all seven “frequent nesting” beach profiles in
Maliangin Island Sanctuary (MIS).

Figure 4.6 Combination of all seven “seldom nesting” beach profiles in
Maliangin Island Sanctuary (MIS).

Figure 4.7 Height of turtle nesting beach platforms across all stations.
White and grey bars in the graph represent the “frequent
nesting” and “seldom nesting” stations, respectively.

Figure 4.8 Foreshore slope degree across all, “frequent nesting” and
“seldom nesting” stations surveyed. Bars indicate the value
of standard deviation (s.d.).

Figure 4.9 Beach sand grain size distribution graphs at station BP 1
(“seldom nesting” station).

Figure 4.10 Beach sand grain size distribution graphs at station BP 2
(“frequent nesting” station).

Figure 4.11 Beach sand grain size distribution graphs at station BP 3
(“seldom nesting” station).

Figure 4.12 Beach sand grain size distribution graphs at station BP 4
(“seldom nesting” station).

Figure 4.13 Beach sand grain size distribution graphs at station BP 5
(“frequent nesting” station).

Figure 4.14 Beach sand grain size distribution graphs at station BP 6
(“seldom nesting” station).

Figure 4.15 Beach sand grain size distribution graphs at station BP 7
(“seldom nesting” station).
Figure 4.16 Beach sand grain size distribution graphs at station BP 8
("seldom nesting" station).

Figure 4.17 Beach sand grain size distribution graphs at station BP 9
("seldom nesting" station).

Figure 4.18 Beach sand grain size distribution graphs at station BP 10
("frequent nesting" station).

Figure 4.19 Beach sand grain size distribution graphs at station BP 11
("frequent nesting" station).

Figure 4.20 Beach sand grain size distribution graphs at station BP 12
("frequent nesting" station).

Figure 4.21 Beach sand grain size distribution graphs at station BP 13
("frequent nesting" station).

Figure 4.22 Beach sand grain size distribution graphs at station BP 14
("frequent nesting" station).

Figure 4.23 Grain size distribution graphs for green turtles at "frequent
nesting" stations.

Figure 4.24 Grain size distribution graphs for green turtles at "seldom
nesting" stations.

Figure 4.25 Grain size distribution graphs for hawksbill turtles at
"frequent nesting" stations.

Figure 4.26 Grain size distribution graphs for hawksbill turtles at "seldom
nesting" stations.

Figure 4.27 Seagrass coverage for Halodule pinifolia (HP), Halophila
ovalis (HO), Halophila minor (HM), Cymodocea serrulata (CS),
Cymodocea rotundata (CR) and Thalassia hemprichii (TH) across transect
length at SG 1A.

Figure 4.28 Seagrass coverage for Halodule pinifolia (HP), Halophila
ovalis (HO), Halophila minor (HM), Cymodocea serrulata (CS),
Cymodocea rotundata (CR) and Thalassia hemprichii (TH) across transect
length at SG 1B.

Figure 4.29 Seagrass coverage for Halodule pinifolia (HP), Halophila
ovalis (HO), Halophila minor (HM), Cymodocea serrulata (CS),
Cymodocea rotundata (CR) and Thalassia hemprichii (TH) across transect
length at SG 2A.
Figure 4.30 Seagrass coverage for *Halodule pinifolia* (HP), *Halophila ovalis* (HO), *Halophila minor* (HM), *Cymodocea serrulata* (CS), *Cymodocea rotundata* (CR) and *Thalassia hemprichii* (TH) across transect length at SG 2B.

Figure 4.31 Seagrass coverage for *Halodule pinifolia* (HP), *Halophila ovalis* (HO), *Halophila minor* (HM), *Cymodocea serrulata* (CS), *Cymodocea rotundata* (CR) and *Thalassia hemprichii* (TH) across transect length at SG 3A.

Figure 4.32 Seagrass coverage for *Halodule pinifolia* (HP), *Halophila ovalis* (HO), *Halophila minor* (HM), *Cymodocea serrulata* (CS), *Cymodocea rotundata* (CR) and *Thalassia hemprichii* (TH) across transect length at SG 3B.

Figure 4.33 Seagrass coverage for *Halodule pinifolia* (HP), *Halophila ovalis* (HO), *Halophila minor* (HM), *Cymodocea serrulata* (CS), *Cymodocea rotundata* (CR) and *Thalassia hemprichii* (TH) across transect length at SG 3C.

Figure 4.34 Seagrass coverage for *Halodule pinifolia* (HP), *Halophila ovalis* (HO), *Halophila minor* (HM), *Cymodocea serrulata* (CS), *Cymodocea rotundata* (CR) and *Thalassia hemprichii* (TH) across transect length at SG 4A.

Figure 4.35 Mean percentage cover of all life-form categories at all nine stations.

Figure 4.36 Mean percentage cover for the six major benthic life-forms: hard corals (HC), dead corals (DC), soft corals (SC), abiotic substance (AB), algae (AL) and other fauna (OT) at all nine stations in MIS.

Figure 4.37 The mean condition index (CI), development index (DI) and succession index (SI) at all nine stations.

Figure 4.38 r-K-S ternary diagram for all nine stations.

Figure 4.39 Mean morphological diversity index (mH') and mortality index (MI).

Figure 4.40 Status of coral reefs at all stations in MIS. Solid stars indicate the location of stations.

Figure 4.41 Mean abundance of damselfishes, butterflyfishes and groupers at all nine stations. Bars indicate the value of standard deviation (s.d.).
Figure 4.42  Mean distribution for fish diversity index of damselfish, butterflyfish and grouper at all nine stations.

Figure 4.43  Abundance of damselfish and %LCC at all nine stations. Bars indicate the value of standard deviation (s.d.).

Figure 4.44  Abundance of butterflyfishes and %r at all nine stations. Bars indicate the value of standard deviation (s.d.).

Figure 4.45  Abundance of groupers and %K across stations. Bars indicate the value of standard deviation (s.d.).
### LIST OF PLATES

<table>
<thead>
<tr>
<th>Plate</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Seagrass Species found in Maliangin Island Sanctuary (MIS). <em>Thalassia hemprichii</em> (TH), <em>Halodule pinifolia</em> (HP), <em>Halophila minor</em> (HM), <em>Halophila ovalis</em> (HO), <em>Cymodocea serrulata</em> (CS) and <em>Cymodocea rotundata</em> (CR).</td>
<td>107</td>
</tr>
<tr>
<td>4.2</td>
<td>A typical example of sponge <em>Callyspongia</em> sp. without bite mark (left) and with bite marks (right).</td>
<td>114</td>
</tr>
<tr>
<td>4.3</td>
<td>Bitten sponge genera found in Maliangin Island Sanctuary (MIS). <em>Amphimedon</em>, <em>Callyspongia</em>, <em>Haliclona</em> and <em>Leuconia</em>.</td>
<td>117</td>
</tr>
</tbody>
</table>
# LIST OF EQUATIONS

<table>
<thead>
<tr>
<th>Equation 3.1</th>
<th>Foreshore sloping degree</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equation 3.2</td>
<td>Platform height</td>
<td>61</td>
</tr>
<tr>
<td>Equation 3.3</td>
<td>$\Phi$ (phi) value</td>
<td>63</td>
</tr>
<tr>
<td>Equation 3.4</td>
<td>Median ($M_{ad}$)</td>
<td>63</td>
</tr>
<tr>
<td>Equation 3.5</td>
<td>Mean ($M_o$)</td>
<td>63</td>
</tr>
<tr>
<td>Equation 3.6</td>
<td>Standard deviation ($\sigma_d$)</td>
<td>64</td>
</tr>
<tr>
<td>Equation 3.7</td>
<td>Skewness ($\alpha_d$)</td>
<td>64</td>
</tr>
<tr>
<td>Equation 3.8</td>
<td>Kurtosis ($\beta_d$)</td>
<td>64</td>
</tr>
<tr>
<td>Equation 3.9</td>
<td>Longshore current speed</td>
<td>65</td>
</tr>
<tr>
<td>Equation 3.10</td>
<td>Seagrass coverage (C)</td>
<td>69</td>
</tr>
<tr>
<td>Equation 3.11</td>
<td>Sponge density</td>
<td>71</td>
</tr>
<tr>
<td>Equation 3.12</td>
<td>Percentage covers of life-form categories</td>
<td>72</td>
</tr>
<tr>
<td>Equation 3.13</td>
<td>Percentage live coral cover (LCC)</td>
<td>72</td>
</tr>
<tr>
<td>Equation 3.14</td>
<td>Condition index (CI)</td>
<td>72</td>
</tr>
<tr>
<td>Equation 3.15</td>
<td>Development index (DI)</td>
<td>73</td>
</tr>
<tr>
<td>Equation 3.16</td>
<td>Succession index (SI)</td>
<td>73</td>
</tr>
<tr>
<td>Equation 3.17</td>
<td>Morphological diversity indices ($mH'$)</td>
<td>74</td>
</tr>
<tr>
<td>Equation 3.18</td>
<td>Coral mortality index (MI)</td>
<td>75</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>AIMS</td>
<td>Australian Institute of Marine Science</td>
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</tr>
<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
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<tr>
<td>BEAC</td>
<td>Banggi Environmental Awareness Centre</td>
<td></td>
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<tr>
<td>BMRI</td>
<td>Borneo Marine Research Institute</td>
<td></td>
</tr>
<tr>
<td>CC</td>
<td>Conservation class</td>
<td></td>
</tr>
<tr>
<td>CCL</td>
<td>Curved carapace length</td>
<td></td>
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<tr>
<td>CI</td>
<td>Condition index</td>
<td></td>
</tr>
<tr>
<td>CITES</td>
<td>Convention on International Trade in Endangered Species of Wild Fauna and Flora</td>
<td></td>
</tr>
<tr>
<td>df</td>
<td>Degree of freedom</td>
<td></td>
</tr>
<tr>
<td>DI</td>
<td>Development index</td>
<td></td>
</tr>
<tr>
<td>ENSO</td>
<td>El Niño-Southern Oscillation</td>
<td></td>
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<tr>
<td>FWS</td>
<td>Fish and Wildlife Service</td>
<td></td>
</tr>
<tr>
<td>HWL</td>
<td>High Water Level</td>
<td></td>
</tr>
<tr>
<td>ISRS</td>
<td>International Society for Reef Studies</td>
<td></td>
</tr>
<tr>
<td>IUCN</td>
<td>International Union for Conservation of Nature</td>
<td></td>
</tr>
<tr>
<td>LEO</td>
<td>Littoral Environment Observation</td>
<td></td>
</tr>
<tr>
<td>LIT</td>
<td>Line Intercept Transect</td>
<td></td>
</tr>
<tr>
<td>LT</td>
<td>Linear Transect</td>
<td></td>
</tr>
<tr>
<td>LWL</td>
<td>Low Water level</td>
<td></td>
</tr>
<tr>
<td>mH'</td>
<td>Morphological diversity index</td>
<td></td>
</tr>
<tr>
<td>MI</td>
<td>Mortality index</td>
<td></td>
</tr>
<tr>
<td>MIS</td>
<td>Maliangin Island Sanctuary</td>
<td></td>
</tr>
<tr>
<td>MPAs</td>
<td>Marine Protected Areas</td>
<td></td>
</tr>
</tbody>
</table>
MWL  Mid Water Level
NMFS  National Marine Fisheries Service
PCA  Priority Conservation Area
r-K-S  Ruderals- competitors - stress-tolerators
SCL  Average straight carapace length
SEA  Southeast Asia
SI  Succession index
TIP  Turtle Islands Park of Sabah
TMP  Tun Mustapha Park
UVC  Underwater Visual Census
## LIST OF APPENDICES

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix 1</td>
<td>Interview Questionnaire Forms</td>
<td>199</td>
</tr>
<tr>
<td>Appendix 2</td>
<td>Beach Profile Datasheet</td>
<td>201</td>
</tr>
<tr>
<td>Appendix 3</td>
<td>Stations, Coordinates and Locations for Beach Profiling Stations</td>
<td>202</td>
</tr>
<tr>
<td>Appendix 4</td>
<td>Grain Size Classification Table</td>
<td>203</td>
</tr>
<tr>
<td>Appendix 5</td>
<td>Verbal Description of Statistical Parameters: Sorting, Skewness and Kurtosis</td>
<td>204</td>
</tr>
<tr>
<td>Appendix 6</td>
<td>Littoral Environment Observation (LEO) Datasheet</td>
<td>205</td>
</tr>
<tr>
<td>Appendix 7</td>
<td>Stations, Coordinates and Locations for Seagrass Field Work at MIS</td>
<td>206</td>
</tr>
<tr>
<td>Appendix 8</td>
<td>Stations, Coordinates and Locations for Line Intercept Transect (LIT) Underwater Surveys at MIS</td>
<td>207</td>
</tr>
<tr>
<td>Appendix 9</td>
<td>Life-form category codes of all benthic substrates</td>
<td>208</td>
</tr>
<tr>
<td>Appendix 10</td>
<td>Mann-Whitney U test result for nesting platform analysis</td>
<td>209</td>
</tr>
<tr>
<td>Appendix 11</td>
<td>Mann-Whitney U test results for Littoral Environment Observation (LEO) between “frequent nesting” and “seldom nesting” stations</td>
<td>210</td>
</tr>
<tr>
<td>Appendix 12</td>
<td>One-way ANOVA test results for median, mean, standard deviation, skewness and Kruskal-Wallis test results for transformed kurtosis across all stations</td>
<td>211</td>
</tr>
<tr>
<td>Appendix 13</td>
<td>Mann-Whitney U test results for the comparison of turtle egg chamber grain size statistical parameters between “frequent nesting” and “seldom nesting” stations of green and hawksbill turtles at MIS</td>
<td>221</td>
</tr>
<tr>
<td>Appendix 14</td>
<td>Mann-Whitney U test results for the comparison of turtle egg chamber grain size statistical parameters between “frequent nesting” and “seldom nesting” stations of green and hawksbill turtles at MIS</td>
<td>222</td>
</tr>
<tr>
<td>Appendix 15</td>
<td>Kruskal-Wallis test results of both density of edible sponges and density of total sponges (in unit $x10^{-3} \text{m}^{-2}$) among all LT stations surveyed</td>
<td>223</td>
</tr>
</tbody>
</table>
Appendix 16  Kruskal-Wallis test results of both density of edible sponges and density of total sponges (in unit $x10^{-3} m^2$) among all LT stations surveyed

Appendix 17  One-way ANOVA test results of mH', MI and LCC across CC scores

Appendix 18  Pearson correlation coefficients test results of LCC with abundance of fish indicators, LCC with diversity of fish indicators, mH' with abundance of fish indicators and mH' with diversity of fish indicators across all nine stations

Appendix 19  Pearson correlation coefficients test results of fish indicators (damselfish, butterflyfish and grouper) abundance and fish indicators diversity with coral morphologies across all nine stations
CHAPTER 1

INTRODUCTION

1.1 Introduction

Tun Mustapha Park (TMP) is Kudat-Banggi’s Priority Conservation Area (PCA) that was proposed by the Sabah State Government under the jurisdiction of Sabah Parks (WWF-Malaysia, 2007). TMP is declared globally significant for its rich mixture of habitats (seagrasses, mangroves, coral reefs and open sea), endangered species (dugongs, whales, whale sharks, dolphins and sea turtles) and its fisheries (Daw et al., 2002; Daw et al., 2003; WWF-Malaysia, 2007). The one million hectare protected area, once gazetted, will be the largest marine park in Malaysia and one of the largest in SEA. The TMP is consisted of the districts of Kudat, Kota Marudu and Pitas where most of the population lived as fishermen; making a living through subsistence and commercial fishing. The proper management of TMP is expected to economically benefit both the country and livelihoods of an estimated 80,000 people of various ethnics and cultures living in these three districts (WWF-Malaysia, 2007).

Within TMP, Banggi Island (as the largest island in Malaysia (440.7 km²) surrounded by approximately 70 other islands, of which 33 are inhabited (Biusing, 2001)) has the second largest concentration of coral reefs in Malaysia (WWF-Malaysia, 2007). Coral reefs surveyed were mainly fringing reefs and patch reefs extending to depths of 10 to 15 m (Koh et al., 2002). The highest coral cover and diversity occurred in the upper 8 m, below which coral cover and diversity decreased considerably. Underwater visibility ranged from 4 to 12 m with the fringing reefs having lower visibility. This may be due to the presence of natural runoffs or human habitation. Coral reefs of the Banggi Islands are included in the WWF’s Sulu-Sulawesi Marine Eco-region of Indonesia, the Philippines and Malaysia. An eco-region is defined as “a large unit of land or water containing a geographically distinct assemblage of species, natural communities and environmental conditions” (Green and Mous, 2004). The marine environment around Banggi Island was regarded as one of the richest in the world.
REFERENCES


