

## CONTENTS

|   | <b>Page</b> |
|---|-------------|
| Abstract (Thai).....                                      | (3)         |
| Abstract (English).....                                   | (5)         |
| Acknowledgement.....                                      | (7)         |
| Contents.....   | (9)         |
| List of Tables.....                                       | (10)        |
| List of Illustrations.....                                | (11)        |
| Abbreviations and Symbols.....                            | (12)        |
| Chapter   |             |
| 1 Introduction.....                                       | 1           |
| Introduction.....   | 1           |
| Review of Literatures.....                                | 3           |
| Objectives.....   | 19          |
| 2 Method of Study.....                                    | 20          |
| Site Description .....                                    | 20          |
| Field Sampling & Measurement and Laboratory Analysis..... | 25          |
| Statistical Method.....                                   | 28          |
| Water Quality Indices.....                                | 29          |
| Sediment Indices.....                                     | 30          |
| 3 Result and Discussion.....                              | 31          |
| 4 Conclusion.....   | 66          |
| Bibliography.....   | 68          |
| Appendix.....   | 76          |
| Vitae.....  | 79          |

## LIST OF TABLES

| <b>Table</b> |  | <b>Page</b> |
|--------------|--|-------------|
| 1            | Preliminary Classification of Trophic State in the OECD Eutrophication Program   | 6           |
| 2            | Characteristics of the Pattani Dam Reservoir   | 24          |
| 3            | Comparison of Water Chemistry Analysis for Pattani Dam Reservoir in the Previous Study and the Present Study   | 43          |
| 4            | Co-occurrence of Macrophyte Community between Taxon and Sampling Site in Pattani Dam Reservoir   | 54          |
| 5            | Comparison of Lead Concentrations of Pattani Dam Reservoir with Threshold Effect Level and Probable Effect Concentration Sediment Quality Guidelines | 60          |
| 6            | Sediment Quality Criteria and Contamination Factor of Sediments from Pattani Dam Reservoir   | 61          |

## LIST OF ILLUSTRATIONS

| Figure  | Page |
|---|------|
| 1 Probability Distribution for Different Trophic Categories as a Function of Mean Chlorophyll-a Concentration (mg/m <sup>3</sup> ) on Logarithmic Scale | 7    |
| 2 EPA's Framework for Ecological Risk Assessment  | 10   |
| 3 Map of Sampling Site in Pattani Dam Reservoir   | 20   |
| 4 Sampling Sites in Pattani Dam Reservoir   | 21   |
| 5 Transparency of Pattani Dam Reservoir   | 32   |
| 6 Dissolved Oxygen of Pattani Dam Reservoir   | 33   |
| 7 BOD <sub>5</sub> of Pattani Dam Reservoir   | 34   |
| 8 Total Phosphorus Content of Pattani Dam Reservoir   | 35   |
| 9 Nitrate-nitrogen Content of Pattani Dam Reservoir   | 35   |
| 10 Chlorophyll-a Content of Pattani Dam Reservoir   | 37   |
| 11 Conductivity Reading of Pattani Dam Reservoir  | 39   |
| 12 pH Reading of Pattani Dam Reservoir  | 40   |
| 13 Correlation between all Chemical Parameters Used in Pattani Dam Reservoir  | 45   |
| 14 Similarity of Sampling sites Using Average Linkage (Between Groups) of Chemical Data   | 46   |
| 15 Distribution Pattern of 14 Macrophyte Species in the Pattani Dam Reservoir   | 49   |
| 16 Similarity of Sampling Sites Based on the Composition of Macrophyte  | 52   |
| 17 Concentration of Lead in Sediments from Pattani Dam Reservoir  | 59   |
| 18 Hazard Quotients for Pattani Dam Reservoir   | 63   |

## ABBREVIATIONS AND SYMBOLS

|                  |   |   |
|------------------|---|---|
| APHA             | = | American Public Health Association                    |
| BAF              | = | Bioaccumulation Factor                                |
| BCF              | = | Bioconcentration Factor                               |
| BOD <sub>5</sub> | = | 5-day Biochemical Oxygen Demand                       |
| CEC              | = | Cation Exchange Capacity                              |
| C <sub>f</sub>   | = | Contamination Factor                                  |
| Chl              | = | Chlorophyll-a   |
| COND             | = | Conductivity  |
| DO               | = | Dissolved Oxygen                                      |
| EIA              | = | Environmental Impact Assessment                       |
| EcoRA            | = | Ecological Risk Assessment                            |
| ERA              | = | Environmental Risk Assessment                         |
| GPS              | = | Global Positioning System                             |
| HQ               | = | Hazard Quotient                                       |
| LSD              | = | Least Significant Difference                          |
| NIDA             | = | National Institute of Development Administration      |
| NH <sub>3</sub>  | = | Ammonia-Nitrogen                                      |
| NO <sub>2</sub>  | = | Nitrite Nitrogen                                      |
| NO <sub>3</sub>  | = | Nitrate Nitrogen                                      |
| OEC              | = | Observed Exposure Concentration                       |
| OECD             | = | Organization for Economic Cooperation and Development |
| Pb               | = | Lead  |
| PEC              | = | Probable Effect Concentration                         |
| PER              | = | Potential Ecological Risk                             |
| PRV              | = | Pre-industrial Reference Value                        |
| SD               | = | Secchi Depth  |
| SETAC            | = | Society of Environmental Toxicology and Chemistry     |

SQC = Sediment Quality Criteria  
SQGs = Sediment Quality Guidelines  
TEL = Threshold Effect Level  
TP = Total Phosphorus  
TSI = Trophic State Index  
USEPA = United States Environmental Protection Agency  
WQI = Water Quality Index