UNIVERSITI TEKNOLOGI MARA

MANGROVE VULNERABILITY MODEL OF LANGKAWI USING THE GEOSPATIAL METHOD

NURHAFIZHA BINTI NORDIN

Disertation submitted in partial fulfillment
of the requirements for the degree of
Bachelor of Surveying Science and Geomatics
(Hons)

Faculty of Architecture, Planning and Surveying

AUG 2022

ACKNOWLEDGEMENT

First and foremost, Alhamdulillah, I am grateful to ALLAH S.W.T. for providing me with the opportunity to embark on my Final Year Project and for completing this long and difficult trip.

I'd like to convey my heartfelt gratitude to my supervisor, Sr Gs Dr Fazly Amri bin Mohd, for his unwavering support and a never-ending supply of exciting tasks. His unassuming approach to science and research is an inspiration. His approach is mirrored in his straightforward writing style, which I intend to continue throughout my studies.

Thank you to Gs Dr Nurul Ain Binti Mohd Zaki, who helped me conduct a lot of research and taught me a lot of new things in class, as well as my classmates, who taught me and answered my questions. I owe them a debt of gratitude.

I'd also like to express my gratitude to my family and friends for their support. Without such help, I would not have been able to finish this research, especially in terms of mental health and financial assistance during my final year project.

Finally, but certainly not least, I am overwhelmed with humility and gratitude to acknowledge my gratitude to all those who have assisted me in putting these concepts, much above the level of simplicity, into something concrete. I'm working on this final year project, not just for the sake of getting good grades, but also to expand my knowledge. Alhamdulillah.

ABSTRACT

A mangrove is a type of woody tree or shrub that grows along sheltered coasts in tropical or subtropical climates. The many species of mangroves aren't strictly linked to one another, but they do have the remarkable capacity to flourish in salty soil within reach of the tides. To achieve this goal, the study recommends examining natural and human impacts on channel morphological changes, followed by an get the risk ranking of the Mangrove Vulnerability index (MVI) and producing the final map of MVI by using the geospatial method. The findings of mangrove species, mangrove diameter, mean tidal range and human activity were used to evaluate the MVI. As the result, four parameters have been selected in this study and classified into five vulnerability raking: very low, low, moderate, high, and very high. A thorough MVI was produced by integrating the differential weighted rank values of the variables. The most risk ranking is human activities in high vulnerability level and follow by mangrove diameter in low vulnerability and in very low vulnerability is mangrove species and mean tidal range. The result in MVI is 1.414 for the MVI value and 50% for the percentile of MVI. The final MVI map produced for this study is a consequence of combining all the characteristics, and the Tuba Island region classified moderately vulnerable. Finally, the outcome of this study is to model the vulnerability of the mangrove channel to promote more sustainable exploration and use of the Tuba Island channel soon.

TABLE OF CONTENT

CHAPTER ONE
INTRODUCTION

1.1 Introduction

For this research project, this chapter presented the research background, problem statement, significance of the study, aim and objectives, research questions, scope, and limits.

1.2 Research Background

Mangrove trees are tropical trees that thrive in environments that most trees cannot, such as saline coastal waters and constant tides. Mangroves are disappearing at a global loss rate of 1–2% every year, with a frightening 35 percent loss rate over the last 20 years (Carugati et. al., 2018). Because of their ability to store significant amounts of carbon, mangrove forests are key weapons in the fight against climate change, even though they are under threat all around the world. As a result, we should help safeguard the future of our world by protecting mangroves.

It is well known that Langkawi is one of the most popular tourist destinations in Malaysia. However, only about 3% of all peninsular mangrove areas are found on Pulau Langkawi which includes three large mangrove areas such as Kampong Kuala Isap-Gua Cerita mangroves, Sungai Ayer Hangat-Kubang Badak mangroves, and Pulau Dayang Bunting-Pulau Tuba mangroves. Aside from the biological features, Langkawi is home to a broad range of mangrove species, including 38 real mangrove species (Omar et. al., 2019).

Moreover, a recent study by Mark Spalding (2021), mangrove forests have gone from being one of the fastest-dwindling environments on Earth to one of the best-protected in the last 20 years. Currently, 42 percent of all extant mangroves are located within legally designated protected areas, while the level of protection provided by these places varies. These areas range in size from small, locally managed sites to vast, nationally governed forests like the Sundarbans, which is protected almost entirely in both Bangladesh and India. Many of the fascinating organisms found in mangroves are also protected, including tigers, proboscis monkeys, sawfish, and seahorses.

Mangrove forests are among the most prolific and carbon-dense ecosystems on the