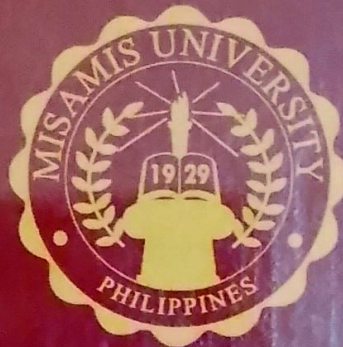


ASSESSMENT OF MANGROVE FOREST IN B ARANGAY MALAUBANG, OZAMIZ CITY, MISAMIS OCCIDENTAL

**A Research Presented to the
Faculty of College of Maritime Education
Misamis University
Ozamiz City**



**In Partial Fulfillment
of the Requirements for the Degree
BACHELOR OF SCIENCE IN MARINE ENGINEERING**

**CHAD REED E. CABAUG
MARK RYAN C. EMEMENCI
JARED A. QUIBOYEN**

November 2024

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November 2024



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CERTIFICATE OF PANEL APPROVAL

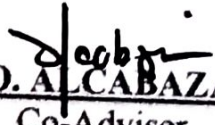
This research paper entitled "ASSESSMENT OF MANGROVE FOREST IN BARANGAY MALAUBANG, OZAMIS CITY, MISAMIS OCCIDENTAL", prepared and submitted by **CHAD REED E. CABAUG, MARK RYAN C. EMEMENCI, JARED A. QUIBOYEN**, in partial fulfillment of the requirements for the Degree of **BACHELOR OF SCIENCE IN MARINE ENGINEERING**, it has been examined and recommended for acceptance.


SHAIRA ALAINA U. GUIAMAN, MS
Instructor

Date


3/E JULIUS REY B. BURBURAN
Adviser

Date


ARJADE O. ALCABAZA, LPT, RChT
Co-Adviser

Date

Approved by the Committee of Oral Examination with a grade of Passed.


CAPT. ALLAN M. ABUCAY
Chairman
Dean, College of Maritime Education

Date

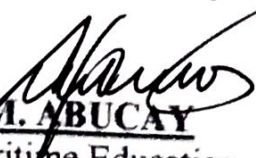

SHAIRA ALAINA U. GUIAMAN, MS
Member

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Date

Accepted and approved in partial fulfillment of the requirements for the Degree of Bachelor of Science in Marine Transportation.


CAPT. ALLAN M. ABUCAY
Dean, College of Maritime Education

Date

ABSTRACT

This study assessed the species composition and ecological condition of the mangrove forest in Barangay Malaubang, Ozamiz City, Misamis Occidental. Mangrove ecosystems play a crucial role in protecting coastal areas, supporting biodiversity, and enhancing local livelihoods. Using a quantitative descriptive approach, a 50x50-meter quadrat was surveyed through ecological field methods to identify and evaluate the dominant mangrove species and their health. Results revealed that the Red Mangrove (*Rhizophora mangle*) is the most dominant species, accounting for 55.2% of the population, followed by the Black Mangrove (*Avicennia germinans*) at 29.3%, and the White Mangrove (*Laguncularia racemosa*) at 15.5%. The dominance of Red Mangrove highlights its vital role in coastal protection and ecological stability. However, challenges such as pollution, limited awareness, and lack of data threaten the sustainability of the mangrove ecosystem. The study recommends continued research, community education, and conservation programs to ensure the long-term health and protection of this important coastal resource.

Keywords: *assessment, barangay Malaubang, ecological condition, mangrove forest, species composition.*

DEDICATION

This research paper is dedicated to:

To our Almighty God, whose guidance and strength have kept us going throughout the process of making this research paper. Our family's unwavering support, encouragement, and love has given us strength throughout this journey. To our mentors and colleagues, whose guidance and wisdom have fueled our perseverance to pursue excellence. To Misamis University, we offer our sincere appreciation for the foundation you have given, shaping our personal and professional growth. To those residents who will benefit from this study, may this contribute to their learning and growth and be used to the betterment of the community. Lastly, the spirit of curiosity and discovery fueled our pursuit of knowledge and innovation.

- The Researchers

ACKNOWLEDGEMENT

The Researchers wish to express their gratitude to the Research Office of Misamis University allowing the execution of this study, to our God Almighty, who has granted the researchers their wisdom and strength to overcome all challenges needed to finish this research. We earnestly thank our families, especially our parents, for their constant financial and emotional backing throughout this endeavor. We are also appreciative to our research advisor, Sir 3/E Julius Burburan for his thoughtful consideration, understanding, guidance, and mentorship. Special appreciation goes to our research instructor, Sir Arjade O. Alcabaza, LPT for his continuous backing and help regarding the aspects of our study. Thank you all for being a part of our journey.

- The Researchers

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INTRODUCTION

Background of the Study

Mangrove forests have significant environmental benefits, including coastal protection, erosion control, habitat for marine life, and climate change mitigation through carbon storage. In the Philippines, these ecosystems are indispensable to coastal communities, contributing to biodiversity, economic stability, and food security. Barangay Malaubang, situated in Ozamiz City, Misamis Occidental, is home to extensive mangrove forests that are crucial for local wildlife and the livelihoods of nearby communities. However, there is insufficient information about the condition of the mangroves in this region, making it challenging to manage and protect them adequately.

Mangroves serve as nurseries for fish, birds, crustaceans, and mollusks, thereby supporting the health of coral reefs and fisheries that are crucial to local economies. Their dense root systems stabilize shorelines, reducing erosion and providing a natural buffer against storm surges, which is increasingly important as climate change heightens the risk of extreme weather. Additionally, mangroves filter pollutants, thereby protecting water quality and contributing to eco-tourism, which in turn supports local economies.

Mangrove ecosystems are critical coastal environments composed of salt-tolerant trees and shrubs that thrive in intertidal zones, supporting biodiversity by providing nursery habitats for fish species essential to local fisheries (Alongi, 2008; Dahdouh-Guebas & Koedam, 2008). These ecosystems also serve as natural coastal barriers, protecting communities from erosion and storm surges and improving water quality by filtering

pollutants and trapping sediments, which is vital for the health of nearby marine environments (Barbier, 2007; FAO, 2007).

Mangrove ecosystems face numerous challenges, including inaccessibility, potential health risks, competition with other coastal ecosystems, and conflicts over land use and resource management. Effective conservation is further complicated by factors such as urbanization, pollution, and the impacts of climate change, including sea-level rise and increased salinity.

However, conflicts over land use and resource management can arise between local communities, government agencies, and businesses, complicating mangrove conservation. Economic activities, such as shrimp farming, can degrade habitats when not sustainably managed, underscoring the importance of addressing these challenges to ensure effective conservation (Duke et al., 2010; Dela Torre, 2017). Moreover, while mangroves provide numerous ecological and socioeconomic benefits, they also have disadvantages. Mangroves can serve as breeding grounds for pests, increasing health risks for nearby residents, and they are vulnerable to the impacts of climate change, including rising sea levels and increased salinity, which threaten their survival (Higgins & Scheiter, 2012; Walters & Sam, 2004). Restoration efforts for mangroves are also costly and demand consistent maintenance, competing for resources with other community needs (Lewis, 2005; UNEP, 2016).

Community programs have been essential in mangrove conservation, particularly in the Philippines, where initiatives that engage local communities in replanting and sustainable management have led to more successful restoration efforts (Leahy, 2012; Dela Torre, 2017). Educational outreach within these programs encourages sustainable practices

and helps residents understand the importance of mangroves, which strengthens conservation efforts (Primavera, 2000). Effective management practices, including reforestation and the establishment of protected areas, not only restore degraded habitats but also enhance mangrove ecological functions, ultimately benefiting local communities by supporting fisheries, improving food security, and providing economic opportunities (Spalding et al., 2010; Barbier, 2007). In summary, the sustainable management and care of mangrove ecosystems are crucial for improving environmental health and fostering resilient livelihoods for nearby communities (Giri et al., 2011; Alongi, 2009).

Objectives of the Study

This study aimed to establish and provide information about the mangrove ecosystems in Barangay Malaubang, Ozamiz City, by understanding species diversity and ecological conditions. It also aimed to suggest ways to manage mangroves that protect the environment while also meeting the needs of local communities.

Significance of the Study

This study is critical because it helps us understand the current condition of mangrove forests in Barangay Malaubang, Ozamiz City. Mangroves protect the coast from storms and erosion, support fish and other marine life, help fight climate change by storing carbon, and provide food and income for local communities. However, there is limited information about the mangroves in this area, making it difficult to protect and manage them properly.

By studying the types of mangrove species and their health, this research can help local leaders, communities, and organizations make better decisions about caring for and protecting these forests. The study's results can also help develop programs that involve the community in mangrove conservation, leading to stronger coastal protection and better livelihoods for people who depend on them.

MATERIALS AND METHODS

Research Design

This study used a quantitative descriptive research methods to provide a clear and accurate description of the current state of the mangrove forest (50 by 50 quadrat), through an ecological field survey, to identify the kind of mangrove present in the area, and to assess what kind of mangrove is dominant in the mangrove forest in Malaubang, and to also assess its health.

Research Environment

The research was conducted in the mangrove forest located in Malaubang, a coastal area known for its diverse mangrove ecosystem. This location was selected for its ecological significance and the presence of mangrove species.

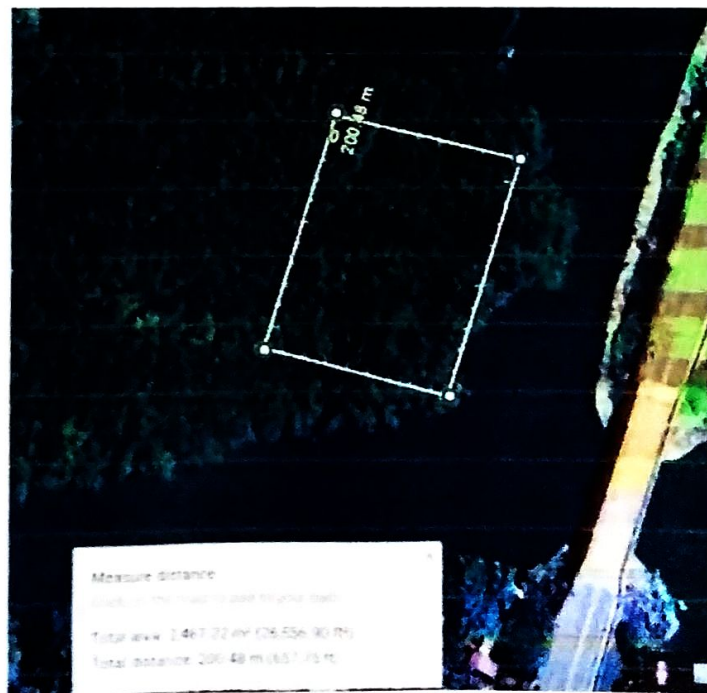


Figure 1. Study Area: Malaubang. Satellite image of the mangrove forest in Malaubang measuring 50 by 50 quadrats.

The study area, a 50 x 50-meter section in a mangrove forest, was chosen to represent the biodiversity and health of the surrounding area. The area is marked and placed carefully to be easily accessible while causing minimal disturbance to the environment. The area is shaped by the interaction between land and water, with tides playing a key role in the mangrove ecosystem. The forest is home to various mangrove species, making it an ideal location to study their distribution, health, and the most common species. Nearby human communities add complexity, as their activities might affect the ecosystem. Data collection was conducted at specific times to coincide with the tidal cycle, ensuring that mangrove roots and surrounding plants were visible and accessible.

The image depicts the lush, green mangrove vegetation that covers a significant portion of the coastal region, indicating a healthy, thriving ecosystem. The mangrove forest is surrounded by water bodies, reflecting the area's tidal influence. These waterways are crucial to the mangrove ecosystem, as they support biodiversity and maintain the area's ecological balance. The image also shows the surrounding coastal landscape, with the forest extending along the shoreline. This visual representation highlights the extent of the mangrove forest and its importance in the local environment, serving as a key reference for understanding the study area.

Sampling Procedures

In this study of the mangrove ecosystem, the researchers employed quadrat sampling, selecting a site measuring 50 by 50 quadrats to ensure a representative sample of the mangrove forest. The researcher also conducted an ecological field survey to understand the distribution and characteristics of the mangrove forest within the area. This

combined approach will provide a complete understanding of the species of mangroves present, their health, and their interaction with the community. This method helps determine the dominant mangrove species and examines the ecosystem and its challenges.

A measuring tape was used to establish a straight line for data collection, enabling precise distance measurements and the identification of sampling points. Rope was used to mark the sampling points along the transect, ensuring accurate and consistent location identification. A field guide, "Mangrove Guidebook for Southeast Asia" by Giesen, W., Wulffraat, S., Zieren, M., & Scholten, L. (2006, FAO & Wetlands International), was used to identify the different mangrove species present in the study area. This helped the researchers accurately record the species composition within the sampling area.

Data Analysis

Quantitative descriptive data from surveys were analyzed using statistical methods to identify trends and correlations, and numerical data were organized and interpreted to describe the mangrove forest assessment.

The data were analyzed by categorizing them into species distribution, health indicators, and environmental factors. Descriptive statistics were used to summarize key metrics, such as species richness, abundance, and biodiversity indices. Patterns and relationships between mangrove health and environmental factors were assessed, and visual tools, such as graphs and maps, were used to illustrate the findings. The analysis evaluated the impact of community interactions on the mangrove ecosystem, providing a comprehensive understanding of its health and challenges.

Ethical Consideration

The researchers wrote a formal letter to Barangay Malaubang, seeking authorization before gathering data in the area. This step is crucial to ensure that research activities comply with local regulations and to enable the collection of necessary information.

RESULTS AND DISCUSSION

This figure shows the population distribution of three common mangrove species in the study area. The area consisted of 58 mangrove plants, of which the Red Mangrove (*Rhizophora mangle*) was the most abundant, with a frequency of 32, accounting for 55.2% of the mangrove population. The Black Mangrove (*Avicennia germinans*), with a frequency of 17, accounts for 29.3%, while the White Mangrove (*Laguncularia racemosa*) makes up 15.5% of the total population, with a frequency of 9. These figures highlight the dominance of Red Mangrove in the area, with Black and White Mangroves being less prevalent. The data provide important insights into the relative abundance of each species, which can inform conservation and management efforts in the region.

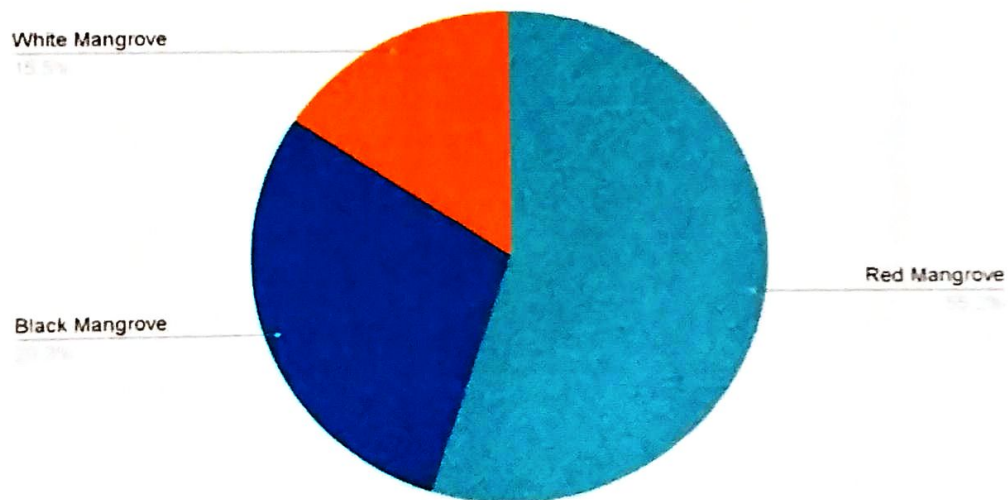


Figure 2. The population of each species is identified.

The diversity indices show that the mangrove forest in Malaubang is moderately diverse, with a clear dominance by red mangrove (*Rhizophora mangle*). While this is common in many Philippine mangrove areas, the lower evenness indicates that other

species are underrepresented. This could be due to environmental factors, human disturbance, or natural competition among species.

For conservation and management purposes, efforts should aim to preserve the existing diversity and promote the growth of less dominant species, such as black mangrove (*Avicennia germinans*) and white mangrove (*Laguncularia racemosa*). Encouraging species balance can help increase ecosystem stability, resilience, and overall health.

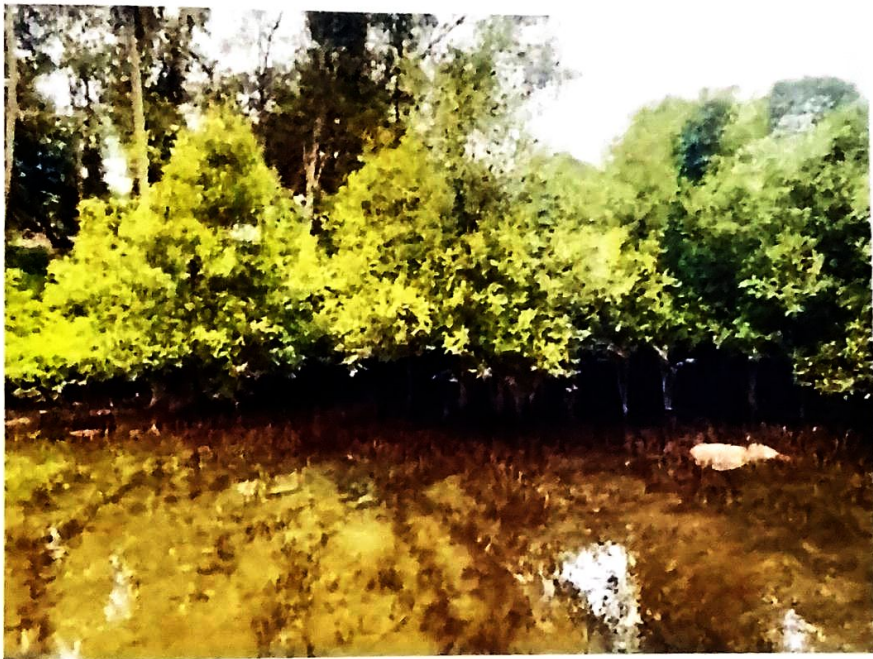


Figure 3. Red mangrove (*Rhizophora mangle*). Dominant species of mangrove seen.

The Red Mangrove (*Rhizophora mangle*) is the primary type of mangrove in the area. It is easily recognized by its special roots, which curve above the water. These roots help the plant survive in salty, tidal coastal areas. The Red Mangrove has thick, dark green leaves that stand out from other plants. Its red "prop roots" help hold the tree in the soft, muddy ground and protect the shoreline from erosion. The Red Mangrove is very important

in mangrove ecosystems, providing shelter and food for many marine and land animals (Tomlinson, P. B., 1986).

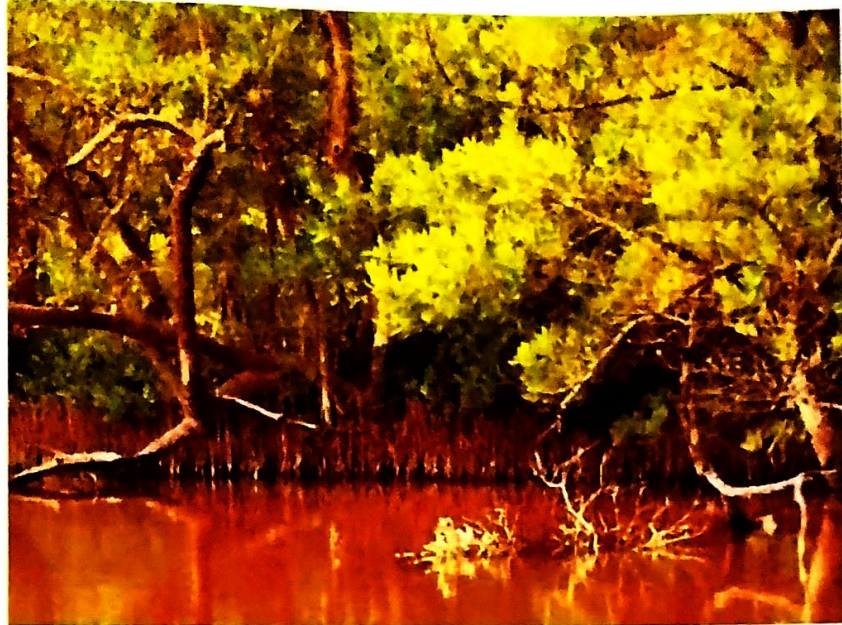


Figure 4. Black Mangrove (*Avicennia germinans*).

Black Mangrove (*Avicennia germinans*) is a mangrove species commonly found in coastal and intertidal areas. It is known for its pencil-like roots, called pneumatophores, that protrude from the soil to help the plant breathe in low-oxygen environments. The leaves are dark green on top and silver-gray underneath, and they can excrete excess salt. Black Mangroves help stabilize coastlines, reduce erosion, and provide habitat for fish, crabs, and birds (Tomlinson, 1986).

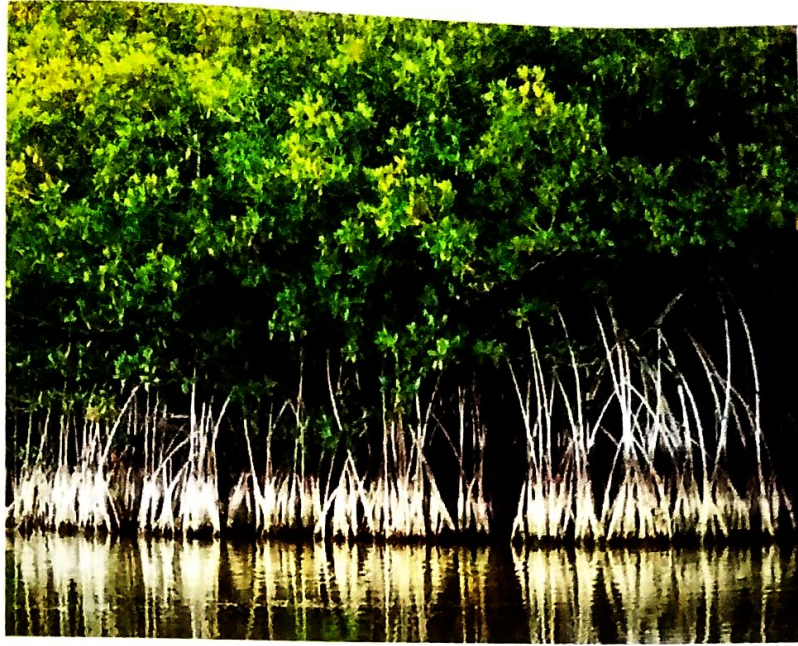


Figure 5. White Mangrove (*Laguncularia racemosa*).

White Mangrove (*Laguncularia racemosa*) is a mangrove species typically found in higher, drier parts of the intertidal zone. It has oval, light green leaves with two small glands at the base that release excess salt. Unlike red and black mangroves, it usually does not have visible above-ground roots, but it can develop peg roots or prop roots in wetter areas. White Mangroves help improve water quality, prevent erosion, and provide shelter for various marine and bird species, Tomlinson, P. B. (1986)

CONCLUSION AND RECOMMENDATION

The mangrove forest in Malaubang, Ozamiz City, is home to a diverse range of mangrove species. The most common is the Red Mangrove (55.2%), followed by the Black Mangrove (29.3%) and the White Mangrove (15.5%). The Red Mangrove is especially important because it protects the coastline and supports local wildlife. The forest also provides shelter and food for marine life like crabs, fish, and shellfish. It helps reduce erosion and improve water quality, benefiting the coastal ecosystem. However, more information is needed to manage and conserve this valuable habitat.

To protect the mangrove forest in Malaubang, further research is needed to better understand its condition. Regular monitoring will help track the health of the mangroves and the species that inhabit them. Protecting the Red Mangrove is especially important, as it helps prevent shoreline erosion. Local communities should learn about the value of mangroves and adopt sustainable practices. Reducing pollution from nearby activities will also help maintain a healthy ecosystem. Responsible use of mangrove resources is key, and if any areas are damaged, restoration projects should be started. These steps will help maintain a healthy mangrove forest for both the environment and the community.

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- Maximizing Waterfront Living: Tips for Building Homes in Coastal Naples. <https://www.selectdevelopmentgroup.com/maximizing-waterfront-living-tips-for-building-homes-in-coastal-naples/>
- EARTH DAY 2023: IMPORTANCE OF MANGROVE TREES – Water Watch Penang. <https://www.waterwatchpenang.org/earth-day-2023-importance-of-mangrove-trees/>
- PREBIODUNES: A Collaborative Initiative to Protect Coastal Biodiversity Kicks Off in Bari - Interreg IPA Adrion Programme. https://www.interreg-ipa-adrion.eu/prebiodunes-a-collaborative-initiative-to-protect-coastal-biodiversity-kicks-off-in-bari/page/2/?et_blog
- İngilizce Hayvan İsimleri. <https://hayvankampi.com.tr/ingilizce-hayvan-isimleri/>
- 11 Best Things To Do in Destin Florida for Adults. <https://rusticsearelics.com/things-to-do-in-destin-florida-for-adults/>

APPENDIX A
Letter of Approval to the Barangay Captain of Malaubang

Office of the Barangay Captain
Hon. Cris Maghanoy
Malaubang Ozamis City, Misamis Occidental

To whom it may concern,

We hope this letter finds you well. We are writing to seek your permission to conduct a research survey in Malaubang, Ozamis City. This study aims to gather valuable data on assessing the mangrove forest in Barangay Malaubang, Ozamis City, identify challenges faced by residents, and propose recommendations for enhancing the status of the mangrove forest in Barangay Malaubang, Ozamis City.

The research will involve interviews and questionnaires and will be conducted in compliance with all ethical guidelines. We anticipate that this study will take place from December 6, 2024, to December 15, 2024, and I assure you that all participants will be treated with respect and confidentiality.

We believe that the insights gained from this research will not only benefit our study but also provide helpful information to the local government and community stakeholders. We are committed to sharing our findings with you and the community upon completion.

Thank you for considering this request. I am happy to provide any further information or discuss this matter at your convenience.

Sincerely,

Chad Reed E. Cabahug
Molave, Zamboanga del Sur 7023
embalsadochad@gmail.com
09167053288

Mark Ryan C. Ememenci Camanga, Tukuran,
Zamboanga del Sur 7016
mark.ememenci@gmail.com
09519398984

Jared A. Quivoven
Ipil City Zamboanga Sibugay, 7001
quiboyenjerd12@gmail.com
09600198497

Sign By: Hon. Christopher S. Maghanoy

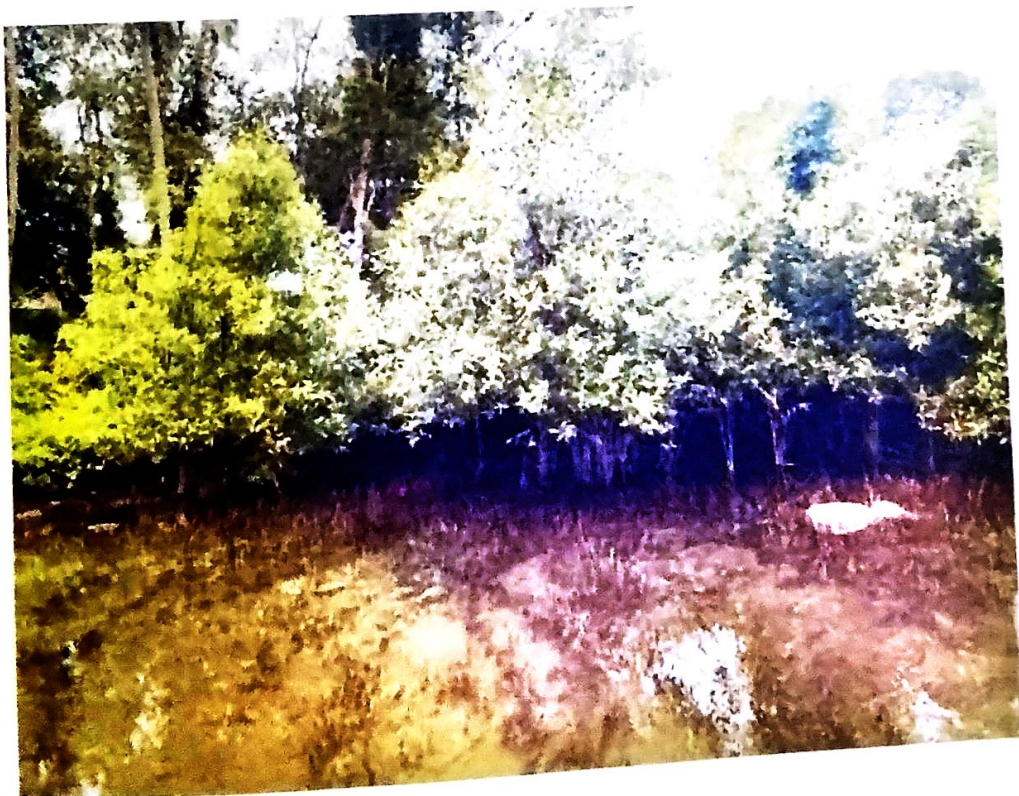
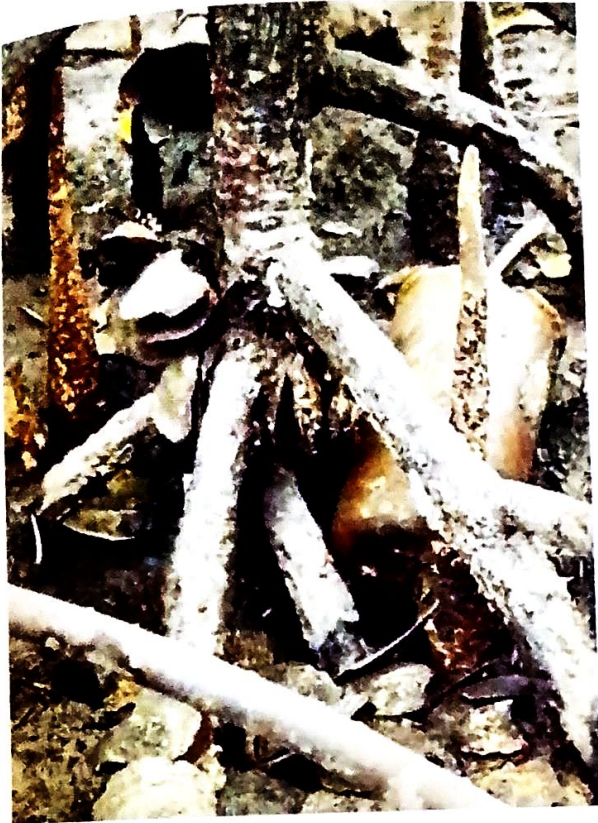
APPENDIX B
Assessment of the Mangrove Forest



APPENDIX C
Measuring a 50 by 50 Quadrat Area using a Measuring Tape



APPENDIX D
Assessment of the Conditions of the mangroves located in the area



APPENDIX E

Grammarly Result

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APPENDIX F Turnitin Result



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APPENDIX G

Documentation



CURRICULUM VITAE

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PERSONAL INFORMATION

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Birthplace: Molave, Zamboanga del Sur Philippines

Age: 22

Nationality: Filipino

Civil Status: Single

Father's Name: Reed N. Cabahug

Mother's Name: Susan E. Cabahug

EDUCATIONAL ATTAINMENTS

Elementary

- Gonosan Elementary school
- Gonosan, Molave, Zamboanga del Sur
- Batch 2013-2014

Secondary

- Molave, Vocational, Technical, School
- Molave, Vocational, Technical, School (CAMPUS 2)
- Humanities and Social Science (HUMSS)
- Batch 2020-2021

Tertiary

- Governor Alfonso D. Tan College (GADTC)
- MISAMIS UNIVERSITY
- OZAMIS CITY, MISAMIS OCCIDENTAL PHILIPPINES
- Bachelor of Science in Marine Engineering
- Batch 2024-2025

CURRICULUM VITAE

E/C EMEMENCI, MARK RYAN C.

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PERSONAL INFORMATION

Birthday: Feb. 4, 2004

Birthplace: Pagadian Provincial Hospital Philippines

Age: 21

Nationality: Filipino

Civil Status: Single

Father's Name: Maynard B. Ememenci

Mother's Name: Anaflor C. Ememenci

EDUCATIONAL ATTAINMENT

Elementary

- Tukuran Sped Center
- Tukuran, Zamboanga del Sur
- Batch 2014-2015

Secondary

- Tukuran Technical Vocational High school (CAMPUS 2)
- SHIELDED METAL ARC WELDING (SMAW)
- Batch 2021-2022

Tertiary

- MISAMIS UNIVERSITY
- OZAMIS CITY, MISAMIS OCCIDENTAL PHILIPPINES
- Bachelor of Science in Marine Engineering
- Batch 2024-2025

CURRICULUM VITAE

E/C QUIBOYEN, JARED A.

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PERSONAL INFORMATION

Birthday: August 20, 2003
Birthplace: Ipil Zamboanga Sibugay Philippines
Age: 21
Nationality: Filipino
Civil Status: Single viii
Father's Name: Johnrey G. Quiboyen
Mother's Name: Daisy A. Quiboyen

EDUCATIONAL ATTAINTMENT

Elementary

- Ipil Heights Elementary school
- Ipil Heights Zamboanga Sibugay
- Batch 2013-2014

Secondary

- Marcelo Spinola School
- Marian Senior High school
- Accountancy Business and Management (ABM)
- Batch 2021-22

Tertiary

- MISAMIS UNIVERSITY
- OZAMIIS CITY, MISAMIS OCCIDENTAL PHILIPPINES
- Bachelor of Science in Marine Engineering
- Batch 2024-2025