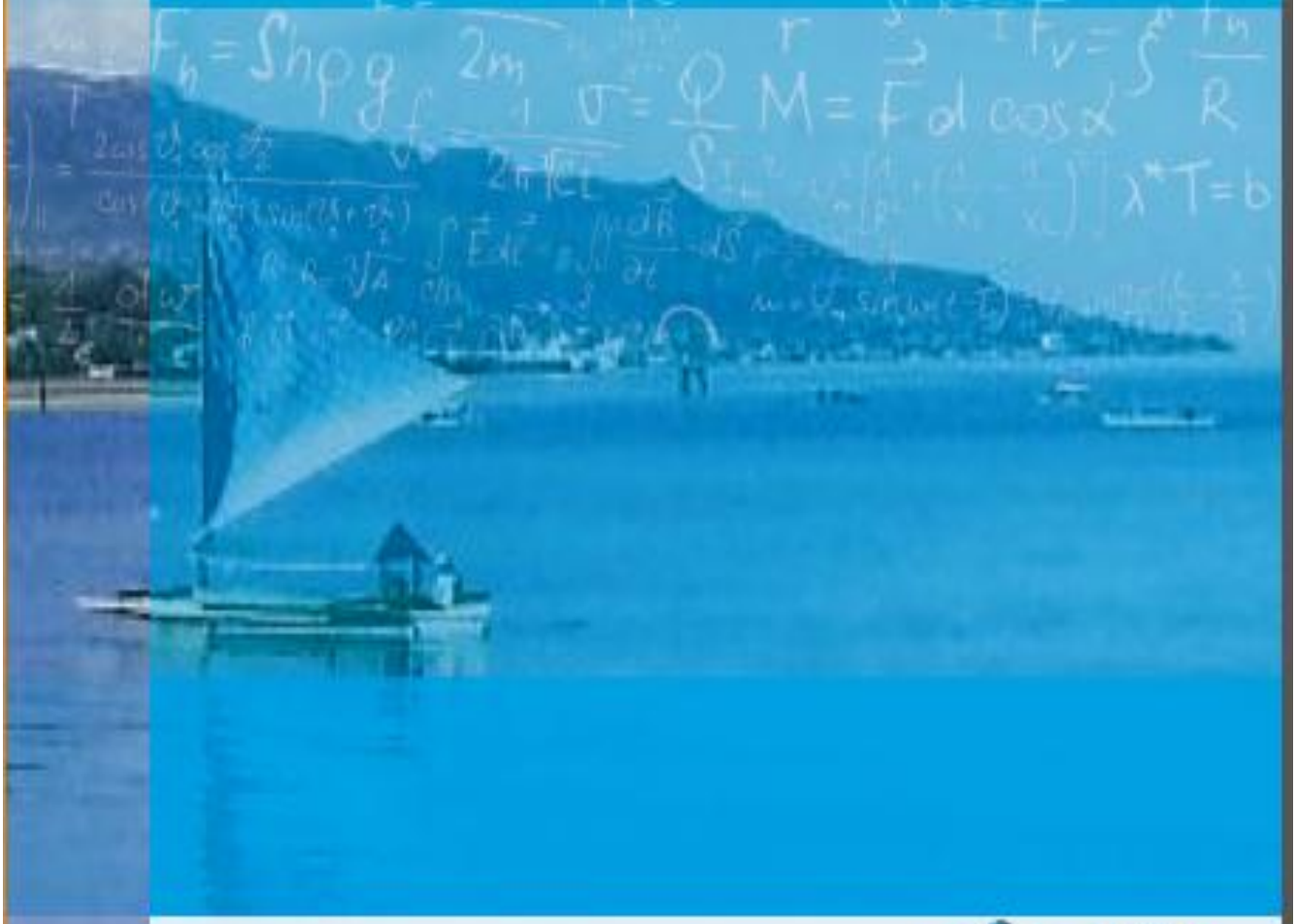
Basic Science
for Sustainable Marine Development

PROCEEDING
INTERNATIONAL SEMINAR 2015

Ambon, 3-4 June 2015



Organized by
Faculty of Mathematics and Natural Sciences
Pattimura University

PROCEEDINGS

1st International Seminar of Basic Science, FMIPA Unpatti - Ambon
June, 3rd – 4th 2015

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Mathematic and Natural Science Faculty
Pattimura University
Ir. M. Putuhena St.
Kampus Poka-Ambon
Pos Code 97233
Email:fmipa_unpatti@gmail.com

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Welcoming Address by The Organizing Committee

The honorable, the rector of Pattimura University

The honorable, the vice rector of academic affair, Pattimura University

The honorable, the vice rector of administration and financial affair, Pattimura University

The honorable, the vice rector of planning, cooperation and information affair, Pattimura University

The honorable, all the deans in Pattimura University

The honorable, the key note speakers and other guests.

We have to thank The Almighty God for the blessings that allow this International seminar can be held today. This is the first seminar about MIPA Science in which the Faculty of MIPA Pattimura University becomes the host. The seminar under the title Basic Science for Sustainable Marine Development will be carried out on 3 June 2015 at Rectorate Building, the second floor. There are 250 participants from lecturers, research institute, students, and also there are 34 papers will be presented.

This International seminar is supported by the amazing people who always give financial as well as moral supports. My special thanks refer to the rector of Pattimura University, Prof. Dr. Thomas Pentury, M.Si, and the Dean of MIPA Faculty, Prof. Dr. Pieter Kakissina, M. Si. I also would like to express my deepest gratitude to Dr. Kotaro Ichikawa, the director of CSEAS Kyoto University, Prof. Bohari M. Yamin, University of Kebangsaan Malaysia, Prof. Dr. Budi Nurani Ruchjana (Prisident of Indonesian Mathematical Society/Indo-MS), Dr. Ir. A. Syailatua, M.Sc (Director of LIPI Ambon), and Hendry Ishak Elim, PhD as the key note speakers. We expect that this international seminar can give valuable information and contribution especially in developing basic science for sustainable marine development in the future.

Last but not least, we realize that as human we have weaknesses in holding this seminar, but personally I believe that there are pearls behind this seminar. Thank you very much.

Chairman

Dr. Netty Siahaya, M.Si.

Opening Remarks
By Dean of Mathematic and Natural Science Faculty

I express my deepest gratitude to The Almighty God for every single blessing He provides us especially in the process of holding the seminar until publishing the proceeding of International Seminar in celebrating the 17th anniversary of MIPA Faculty, Pattimura University. The theme of the anniversary is under the title Basic Science for Sustainable Marine Development. The reason of choosing this theme is that Maluku is one of five areas in Techno Park Marine in Indonesia. Furthermore, it is expected that this development can be means where the process of innovation, it is the conversion of science and technology into economic value can be worthwhile for public welfare especially coastal communities.

Having the second big variety of biological resources in the world, Indonesia is rich of its marine flora and fauna. These potential resources can be treated as high value products that demand by international market. Basic science of MIPA plays important role in developing the management of sustainable marine biological resources.

The scientific articles in this proceeding are the results of research and they are analyzed scientifically. It is expected that this proceeding can be valuable information in terms of developing science and technology for public welfare, especially people in Maluku.

My special thanks refer to all researchers and reviewers for your brilliant ideas in completing and publishing this proceeding. I also would like to express my gratefulness to the dies committee-anniversary of MIPA Faculty for your creativity and hard working in finishing this proceeding, God Bless you all.

Dean of Mathematic and Natural Science Faculty

Prof. Dr. Pieter Kakisina, M.Si.

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Mortality of Coral Reef in the Coastal Waters of the Hila Village Leihitu District Central Maluku

Deli Wakano*, Dece Elisabeth Sahertian

Department of Biology, Faculty of Mathematics and Natural Sciences
Pattimura University, Ambon Indonesia
*Email: delly_wakano@yahoo.com

ABSTRACT

The aims of this research is to know about mortality of coral reefs in the coastal waters of the Hila Village Leihitu District Central Maluku. Methods of research was used LIT (Line Intercept Transect). Line transect draw in parallel the shoreline along 50 m at a depth of 3 m and 10 m. Coral reefs were traversed by the line transect a note. Results of the study, in the coastal water of the Hila Village Leihitu District Central Maluku were coral mortality index value on the both of depth were included in the bad category with IMK of 0.28 at the depth of 3 m and 0.31 at a depth of 10 m.

Key words : coral reefs, mortality, hila village

INTRODUCTION

Some of Indonesia's population live in coastal areas are dependent on fishery shallow sea. The shallow areas that are generally dominated by coral reefs. If people still use traditional ways to catch marine products in this areas, coral reefs damaged to death.

Coral reefs have various functions, as a place of biodiversity, temporary or permanent shelter, feeding, spawning and shelter for marine animals. Furthermore coral reefs as the place for the life cycle of biological, chemical and physical globally have a high level of productivity. Coral reefs have a function as coastal protection from waves (Suharsono, 2008).

According to Sahetapy (2006), coral reefs are very strategic to protect the coast from abrasion process caused by waves directly. It's protection of coastal ecosystem such as seagrass and mangrove ecosystem of the direct threat that can lead damage to it self.

According to Monk et. al., 1977 in Sahetapy (2006), the results of research showed were coral reefs in Indonesia decreased quality so quickly. This fact relates to the nature caracteristics of the coral reef ecosystem that are as easily destroyed and sensitive. The data showed that only 5.1% of the area of coral reefs in Indonesia, including the excellent category, 24% good, 29.2% bad and 41.2% very bad (Suharsono, 1994 and Chou, 2000) in Sahetapy (2006). The main impact of the decline in reef quality comes from the pressure effort of reef fisheries resource use and consumption the economic and human activity in the area of terrestrial.

Moluccas province has more than 1.000 islands, consist of large and small islands, and the islands are very small. Coral reefs ecosystem abroad and prominent presence in coastal waters of moluccas province and its surrounding by small islands. In fact, coral reefs are easily broken, destroyed and sensitive which are in shallow waters and community activities

and satisfied what they need. So it is necessary to study the damage and death of coral reefs, particularly in the coastal waters of the Hila Village District Leihitu of Central Moluccas.

Based on the above, the purpose of this study was to determine the mortality of coral reefs in the coastal waters of the Hila Village Leihitu District of Central Moluccas. Researchers expect from this study is local people and migrant communities to keep the preservation of coral reefs especially those waters.

METHODS

The method in this research was used the LIT (Line Intercept Transect). At each station research transect line with a length of 50 m parallel to the coastline in the coral reefs area with depths 3 m and 10 m. Recorded result of researches on clipbard underwater about each category biotic components (corals, algae) and abiotic (sand, rubble dead, muddy sand, dead coral) that found per line pieces. Coral species were identified using manual identification proposed by Veron (1986), Veron (1995) and Suharsono (2008).

DATA ANALYSIS

Coral mortality index shows the change of life into a dead.

$$Percentage\ of\ cover = \frac{Total\ length\ of\ each\ category\ of\ dead\ coral\ reefs}{Long\ transect}\ X\ 100\%$$

Coral mortality index (CMI) is calculated using the following formula:

$$Coral\ Mortality\ Index = \frac{Percentage\ of\ dead\ coral\ reefs\ cover}{Percentage\ of\ dead\ coral\ reefs\ cover + life\ coral\ reefs}$$

Mortality index value close to zero indicates that no significant change for good coral, while a value close to one indicates that significant changes of life into dead coral reef (English et al, 1997).

RESULTS AND DISCUSSION

Conditions of Dead Coral Reefs in the Coastal Waters of the Hila Village

Table.1. Percentage of Dead coral Reefs in the Coastal Waters of the Hila Village

Base Compounds	% Dead Coral Reefs	
	3 meter	10 meter
Dead Scleractinia		
-Dead Coral Algae (DCA)	6.48	10.20
T o t a l	**6.48**	**10.20**
A l g a e		
-Turf Algae (TA)	1.60	0.00
-Halimeda (HA)	0.24	0.00
T o t a l	**1.48**	**0.00**

Other Fauna		
-Soft Coral (SC)	0.00	0.00
-Sponge (SP)	0.68	1.10
-Other (OT)	0.00	0.00
T o t a l	**0.68**	**1.10**
Abiotic		
-Sand (S)	0.00	0.56
-Rubble (R)	4.60	22.68
T o t a l	**4.60**	**23.24**

Based on observations of the dead coral reefs condition showed that at a depth of 3 m components found on the transect line are components of Dead Coral Algae (DCA) with the cover percentage of 6.48%, and the cover percentage Rubble with 4.60% (Table 1). Meanwhile, at a depth of 10 m, percentage of cover component Rubble with 22.68% and components Dead Coral Algae (DCA) with the percentage of cover 10.20% (Table 1). This shows that at a depth of 10 m there is coral reefs, indicate to damage, which found Rubble with a wide area (Figure 1).

Table 2. Coral mortality index at each depth

Base Compounds	**CMI**	
	3 meter	**10 meter**
Dead Coral Algae (DCA)	0.13	0.15
Rubble (R)	0.67	0.79
Turf Algae (TA)	0.06	0
	0.28	**0.31**

Coral mortality index indicates the magnitude of the change of life into dead coral reefs. Mortality index value close to zero indicates that no significant change to life coral reefs, while values close to one indicate that significant changes of life into a dead.

Based on results in Table 2 about the Coral Mortality Index (CMI) indicates that CMI at a depth of 3 m of 0.28 and at a depth of 10 m was 0.31. These results provide an indication that the mortality of corals reefs in Coastal Waters Hila Village Leihitu District Central Moluccas in the good category.

The level of mortality coral reefs because of water conditions, such as the process of sedimentation, lack of oxygen, nutrients in the water and physical effects of fishing activities, such as fishing with toxic substances, rock mining and sand, anchoring, vessel fuel spills and disposal of household waste. Based on result of this study coral reefs showed in the Coastal Water of Hilla Village in the good category. It's means the condition of the water still optimum to coral reefs growth and fishing activities.

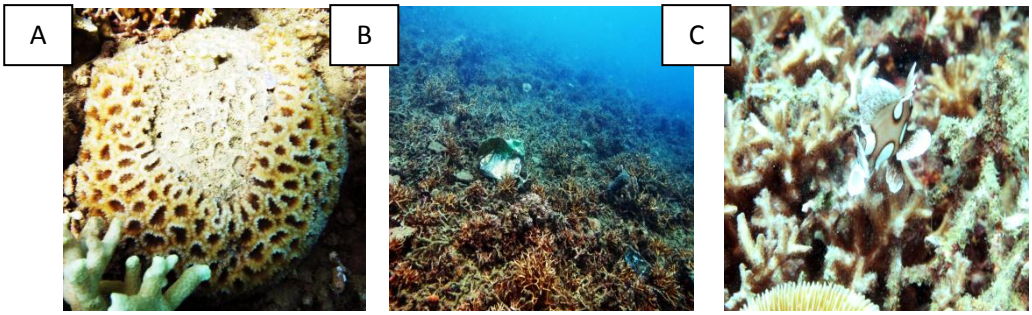

Figure 1. Overlay dead coral (rubble) in the study area at a depth of 10 m. (A) sick corals, (B) stretch of dead corals and (C) dead corals.

CONCLUSIONS

Based on the research, the coral mortality index in the coastal waters of the Hila Village Leihitu District Central Moluccas in the good category, with CMI of 0.28 at the depth of 3 m and 0.31 at a depth of 10 m.

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