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Development Strategy of Marine Tourism

Gusnar Lubis Ismail, Hasim, Lis M Yapanto, Sri Nuryatin Hamzah
Master's Program in Marine Science, Universitas Negeri Gorotalo

Abstract:

This research was carried out in July-October 2023. The research location was in the Barrier Reef in the waters of Botutonuo Village, Kacataman Kabila Bone, Bone Bolango Regency, Gorontalo Province. The consideration for choosing this location is because there is a barrier coral reef and there is also a coral transplant which is located directly opposite the Botutonuo Beach Tourism, so it is important to carry out a study on the development of marine tourism potential which can later be developed to improve the welfare of the local community and its surroundings, this location.Methodand Research Design Coral reefs require optimal environmental conditions, namely warm temperatures above 20o C to be able to grow and reproduce well. Coral reefs also choose to live in clear and unpolluted waters. Based on the results and discussion, the conclusions are as follows: The biophysical waters of Botutonuo Village are in good condition as indicated by a high diversity index value; The level of land suitability for snorkeling and diving tourism at stations II and III is in the suitable category, while station III at each of these tourism sites is in the unsuitable category; The carrying capacity for snorkelling tourism at station I is 53 people/day and at station II people/day, while the carrying capacity for diving activities at each station is 14 people/day.

Keywords: Land suitability, marine ecotourism, land carrying capacity.

INTRODUCTION

Organisms that live at the bottom of shallow sea waters, especially in tropical areas, are capable of building coral skeletons from calcium carbonate, called coral reefs (Vaughan and Wells, 1943 in Supriharyono, 2000). Coral reefs are tropical marine ecosystems found in shallow, clear, warm waters (>22°C), has high levels of CaCO3 (calcium carbonate) and the community is dominated by various types of hard coral animals (Guilcher, 1988).

Coral reefs are grouped into three general types, namely fringing reefs, barrier reefs and ring coral reefs (atolls) Nybakken (1992), which is described as follows:

1. *Fringing Reef*is a fringing coral reef (generally developing along the coast, located on the edge of continental plates and around islands, reaching a depth of no more than 40 meters. This coral reef grows upwards or towards the sea. The growth of this coral reef is usually found in parts that There is quite a current on it, while between the coast and the outer edge, the edge coral reefs have poor growth and many even die due to drought and a lot of sedimentation from the mainland. This type of edge coral reef is often found in Indonesian waters.

2. *Barrier Reef*is a barrier coral reef generally located at various distances from the coast and separated from the coast by a seabed that is too deep for coral to grow (40-70 m). generally extends along the coast and usually circles around as if it is a barrier for immigrants coming from

outside. One example is the Great Brier Reef which lines the northeast of Australia and stretches for 2,300 km.

3. *Atoll*is a ring coral reef that grows around a goba/lagoon and is usually found offshore. The depth of the goba in the atoll is around 45 m, rarely found to a depth of 100 m, like barrier coral reefs. It is predicted that the origin of atolls originates from the edge coral reefs of a volcano which is slowly sinking due to changes in sea level and the accumulation of increasingly heavy coral sediment, for example the atoll on Taka Bonerate Island, South Sulawesi with an area of 2,960 km2 (Tomascik et al. al. 1997).

As an ecosystem typical of tropical waters, coral reefs are composed of calcium carbonate structures formed by a large collection of coral fauna called polyps (Jaap. 2000). Coral reefs are the most productive ecosystems that have a diversity of species that provide various benefits for human life, and can provide environmental services and economic benefits from the fields of fisheries and tourism (Morberg and Folke, 1999)

Coral reefs require optimal environmental conditions, namely warm temperatures above 20o C to be able to grow and reproduce well. Coral reefs also choose to live in clear and unpolluted waters. Therefore, coral reefs will have their habitat disrupted if there is marine pollution and hot temperatures. The waters of the west coast of Sumatra at the beginning of 2016 experienced a natural phenomenon which was quite disturbing to the coral reef ecosystem. This phenomenon is called coral bleaching, where the color of the coral tissue changes from brownish or greenish to pale white. Another incident also occurred in 2017, namely a spike in individual predators in coral reef areas, one of which was Achantaster Planci. This phenomenon certainly has a big influence on the survival of the surrounding coral reefs (Taufina, at al. 2018).

Marine Ecotourism

Based on the definition of tourism and ecotourism (Wood. 2002) states that tourism has a broad scope and activities. Tourism or tourism includes 5 (five) types of activities, namely marine tourism (beach and sun tourism), rural tourism (rural and agrotourism), natural tourism (natural tourism), cultural tourism (cultural tourism), or business travel (business travel). The position of ecotourism is somewhat unique, standing on three legs at once, namely rural tourism, natural tourism and cultural tourism.

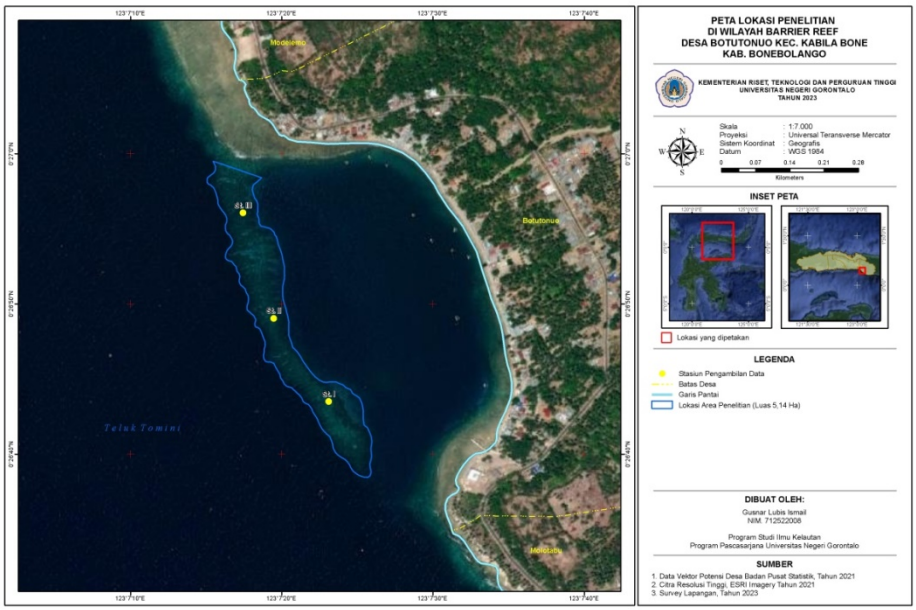
Organizing tourism for destination sustainability has six principles, namely: 1) eliminating as much as possible the negative impact of the presence of 34 tourists on the environment of the tourist destination, 2) carrying out tourist trips with the aim of increasing understanding and awareness of nature, 3) maximizing local community participation, 4) tourists contribute to conservation efforts, 5) provide economic benefits for local communities, and 6) open up opportunities for local communities and tourism workers to utilize the beauty of natural resources (Fennel and Eagles, 1990 in Depbudpar 2007). Thus, to achieve a sustainable destination, it requires the involvement of all related parties, all physical components (ecosystem), socio-cultural and economic in an integrated manner, so that tourism can play a sustainable role by increasing the competitiveness of Tourist Destination Areas (ODTW).

Moscardo and Kim (1990) said that sustainable tourism must pay attention to: 1) Increasing the welfare of local communities, 2) ensuring intergenerational and intergenerational beauty, 3) protecting biological diversity and maintaining existing ecological systems, and 4) ensuring cultural integrity.

Ecological Carrying Capacity

Ecological carrying capacity is based on the understanding that the environment has a maximum capacity to support growth in accordance with its maximum utilization capacity. The definition given by Kenchington and Hudson (1984) states that carrying capacity is the ultimate constraint faced by biota by environmental limitations. such as availability of food, space or spawning grounds, disease, predator cycles, temperature, sunlight and salinity. Dahuri (2002) states that the

carrying capacity of an area ultimately determines the scarcity of vital natural resources and ecosystem services needed by humans and the living organisms that inhabit it. the area. The environmental carrying capacity system is reduced if there is damage caused by humans.



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RESEARCH METHODOLOGY

This research was carried out in July-October 2023. The research location was in the Barrier Reef in the waters of Botutonuo Village, Kacataman Kabila Bone, Bone Bolango Regency, Gorontalo Province. The consideration for choosing this location is because there is a barrier coral reef and there is also a coral transplant which is located directly opposite the Botutonuo Beach Tourism, so it is important to carry out a study on the development of marine tourism potential which can later be developed to improve the welfare of the local community and its surroundings, this location.Methodand Research Design

Methodmarine tourism development strategy in the barrier reef, Botutonuo Village, Bone Bolango Regency, using survey, observation and interview methods. The observation method was used to obtain data about the characteristics of the coral reef ecosystem on the barrier reef, which includes presentation analysiscoral cover, density of coral fish, diversity index of coral fish species, index of evenness of coral fish species,dominance index, tourist water quality parameters, suitability of marine tourism, and formulationmarine tourism development plan in the barrier reef area of Botutonuo Village.

C. Data collection technique

Data collection was carried out through primary data collection and secondary data. Primary data was obtained through interviews and direct observation in the barrier reef area. Bioecological data includes coral reefs, coral fish and benthos, coral lifeforms and water quality. Secondary data was collected from various sources, both government documents and research results that are relevant to this research. The data collection techniques are described as follows:

1. Determination of Research Stations

Determining the location of this research was carried out using purposive sampling by conducting an initial survey. The survey was carried out to determine the right location to collect data with the aim of making it easier for researchers to plan dives and to save more time in collecting data so that the data obtained later could be more representative (Sugiyono, 2010 in et al., 2017). Determination of stations in this study was 3 stations (Figure 3.1) with the following details:

1) Station 1 is a natural coral reef area of the Barrier Reef (natural station) with coordinates 00°26'54.89" N and 123°07'16.28" E.
2) Station 2 is a natural coral reef area of the Barrier Reef with coordinates 00°26'42.27" N and 123°07'22.47" E.
3) Station 3 is a natural coral reef area of the Barrier Reef with coordinates 00°48'07" N and 123°07'17'.95" E.

2. Data Collection Procedures

Data collection procedures in developing marine tourism in the barrier reef area of Botutonuo Village include data on coral reefs, coral fish and water quality parameters.

(a). Coral Cover

Coral reef ecosystem cover data was collected using the LIT (Line Intercept Transect) method referring to UNEP (1993), namely using a 50 m line transect at a depth of 3 m and 10 m. A depth of 3 meters represents coral cover for snorkeling tourism and a depth of 10 meters represents coral cover for diving tourism. The technique for carrying out data collection in the field is where a diver places a 50 m long meter parallel to the coastline, where the beach is located to the diver's left. Coral cover recording is carried out right on the meter line with centimeter accuracy, for observations of bottom filling biota based on growth form (life form) with certain codes (English et al. 1997).

(b). Reef fish

Reef fish data collection in this study used the visual census technique (VCT) on the same transect as the coral reef. The visual census method refers to English et.al., (1997). In detail, the procedures for collecting coral fish data are as follows:

1. Place a 50 meter transect line parallel to the coastline.
2. Wait 10 to 15 minutes to let the disturbed fish return to its original spot.
3. Then return to the start of the transect by passing through another area and not passing around the transect line and remaining in the water.
4. Record coral fish data by diving following the line transect that has been installed around the coral parallel to the coastline, with an estimated width of 2.5 meters on the right and left. The method for collecting coral fish data is shown in Figure 3.2

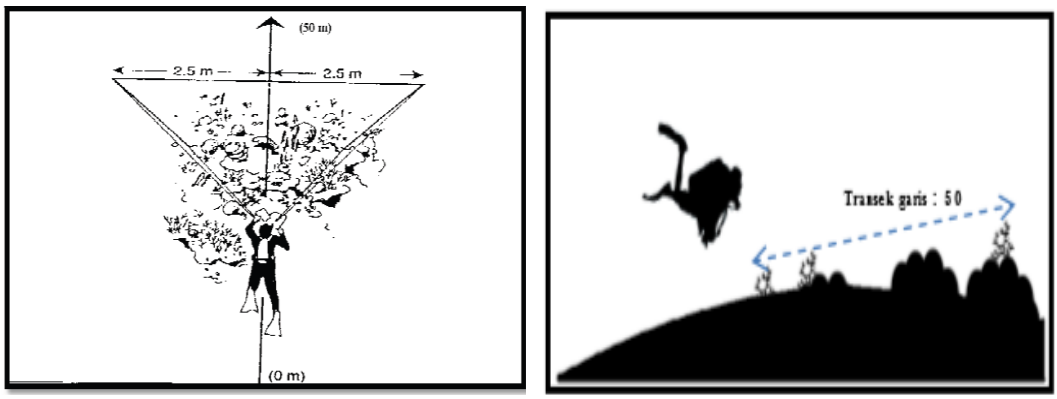

Figure 3.2 Method for collecting coral fish data using visual methods census (English*et al., 1997)*

5. The number of coral fish seen entering the transect area is recorded and the species determined.
6. Reef fish species that are not known are directly written using photo numbers and documented and then identified using a fish identification key book referring to the identification books of Allen and Steene (1996), Kuiter and Tonozuka (2001) and fish base (*www.fishbase.org*).

(c). Water Quality Parameters

ObservationMarine tourism water quality parameters are carried out in situ at the research location, the water quality parameters measured are current speed (cm/sec), brightness (m) and depth (m) at each station withhow to compare the value of each water quality parameter with the water quality standards based on Minister of Environment Decree No. 051 of 2004.

D. Data analysis

1. Percentage of Coral Cover

Coral reef data was collected based on Line Intercepth Transect (LIT) at 2 depths, namely 3 m and 10 m. This was done to determine the condition of the coral reefs at the research location, so it was calculated using an analysis of the percentage of coral cover based on what was put forward by UNEP (1993).).

$$\text{Ni} = \frac{Li}{L} x\ 100$$

Information:

Ni = Percentage cover (%)

Li = Total lengthCategory (cm)

L = Longline transect (5,000 cm)

RESULTS

Data on the condition of live coral cover obtained from the equation above will then be categorized based on the Standard Criteria for Coral Reef Damage according to (KEPMEN LH No.04 of 2004), namely:

0.0 – 24.9% = Damaged

25.0 – 49.9% = Medium

50.0 – 74.9% = Good

75.0 – 100% = Very good

2. Fish Density Analysis

Analysis of coral fish density in the research location of Botutonuo marine waters was analyzed following the formulation (English et al. 1997).

$$\text{D} = \frac{\text{C}}{\text{A}}$$

Information:

D = Density (ind/m2)

C = Number of reef fish counted in observations

A = Wideobservation area (m2)

3. Diversity Index Analysis (H')

The diversity of coral fish species obtained based on the visual census method (VCT) was analyzed using the Shannon-Wiener formulation (Krebs, 2000 in Muqsit et al., 2016).

$$H' = -\sum_{i=1}^{s} (pi)(ln\, pi)$$

Information :

H' = Diversity index
Pi = ∑ni/N)
here = Number of individuals of the i-th species
N = Total number of individuals

The assessment categories for species diversity are as follows:

H' ≤ 1 = Low diversity, low distribution, low community stability
1< H' <3 = Moderate diversity, moderate distribution, moderate community stability
H'> 3 = High diversity, high distribution, high community stability

4. Analysis of the Evenness Index (E)

The Evenness Index (E) is used to describe the almost uniform and even distribution of the number of individuals of each coral fish species, so that the balance of the ecosystem increases. To calculate the species evenness index, it is analyzed using the Shannon-Wiener formulation (Muqsit et al., 2016), namely:

$$E = \frac{H'}{H'max}$$

Information:

E = Evenness
H' = Species balance index
H' max = Maximum diversity index = Ln S
S = Total number of species

The uniformity index value ranges from 0-1, with the following categories.

0 < E ≤ 0.5 = Communities are stressed
0.5< E ≤ 0.75 = The community is unstable
0.75< E ≤ 1.00 = Stable community

5. Dominance Index (C)

MarkA small evenness and diversity index usually indicates dominance of one type over another. To analyze this, use the dominance index formulation referring to Muqsit et al., (2016).

$$C = \sum_{i=1}^{n} Pi^2$$

Information:

C = Dominance Index

Pi = Proportion of the number of individuals in coral species

i = 1, 2,3,…n

The dominance index value ranges from 0-1, with the following categories:

$0 < C < 0.5$ = Low dominance

$0.5 < C < 0.75$ = Low dominance

$0.75 < C < 1$ = High Dominance

6. Analysis of Marine Tourism Suitability

The development of marine tourism activities should be adjusted to the resource potential and its use, because every marine tourism activity has resource and environmental requirements that are appropriate or compatible with the marine tourism object to be developed. Manembu (2013) states that in the sustainable development paradigm, the placement of each utilization activity must be in synergy with the biophysical environment so as to form integrated management. This can be achieved in developing marine tourism by analyzing it using the parameters and criteria formulated by Yulianda (2019), as follows:

$$IKW = \sum_{i=1}^{n} (Bi \times Si)$$

Information :

IKW = Tourism suitability index

n = The number of suitability parameters

Ms = Weight of the ith parameter

Si = Parameter scorei

Marine tourism suitability analysis is carried out in three stages, namely: 1) preparing a suitability matrix, 2) weighting each limiting factor/parameter, and 3) valuing (giving value) the parameters/criteria of a designation. Preparation of a maritime tourism suitability matrix including beach tourism, marine tourism including snorkeling tourism and diving tourism. Next, each parameter is weighted based on the dominance of that parameter in the use of marine tourism activities, then a value is given. The aim of giving a value is to assess the parameter in an evaluation of the suitability of marine tourism. The result of multiplying the weight and value of each parameter is a score of certain parameters in a marine tourism activity designation. The sum of all scores for each parameter is called the total score for a marine tourism activity designation. For the suitability of marine tourism in the snorkeling category, seven parameters with four assessment classifications are considered (Table 3.3) and for the suitability of marine tourism in the diving category, six parameters with three assessment classifications are considered (Table 3.4).

Table 3.2 Suitability matrix for marine tourism in the snorkeling tourism category

No.	Parameter	Weight	Category			
			Score 3	Score 2	Score 1	Score 0
1	Community closure coral (%)	0.375	>75	>50–75	25–50	<25
2	Lifeform type	0.145	>12	>7–12	4–7	<4
3	Types of coral fish	0.140	>50	30–50	10–<30	<10
4	Water brightness (%)	0.100	100	80-<100	20-<80	<20
5	Reef depth coral (m)	0.100	1–3	>3–6	>6–10	>10;<1
6	Current speed cm/sec	0.070	1–15	>15–30	>30–50	>50
7	Width of expanse coral flat (m)	0.070	>500	>100–500	20–100	<20

Source: Yulianda (2019).

Table 3.3 Matrix of suitability for marine tourism in the diving tourism category

No.	Parameter	Weight	Category			
			Score 3	Score 2	Score 1	Score 0
1	Community closure coral (%)	0.375	>75	>50–75	25–50	<25
2	Water brightness (%)	0.150	>80	50–80	20–<50	<20
3	Coral Reef Depth (m)	0.150	6–15	15–20;	<20–30	>30; <3
4	Liferfom type	0.135	>12	>7–12	4–7	<4
5	Types of coral fish	0.120	>100	50–100	20–<50	<20
6	Current speed cm/sec	0.070	0–15	>15–30	>30–50	>50
Source: Yulianda (2019)						

Based on Table 3.2 and Table 3.3, the criteria for suitability for marine tourism for the snorkeling and diving categories are as follows:

Information :

IKW≥2.5 = Very suitable

2.0 < IKW < 2.5 = In accordance

1.0 < IKW< 2.0 = It is not in accordance with

IKW < 1 = Very inappropriat

Biophysical Conditions of Marine Tourism

Research on the biophysical conditions of marine tourism in the barrier reef of Botutonuo Village is divided into the condition of coral reefs consisting of the percentage (%) of coral cover and number of lifeforms, the condition of coral fish including total abundance (tails) and number of families and the presence of biota other than fish which is an attraction for development marine tourism snorkeling and diving...

4.2.1 Condition of Coral Reefs

The condition of the coral reefs in the barrier reef of Botutonuo Village at a depth of 3 meters and 10 meters is in moderate to good condition. The condition of coral reefs at a depth of 3 meters can be seen in Figure 4.2 and at 10 meters can be seen in Figure 4.1.

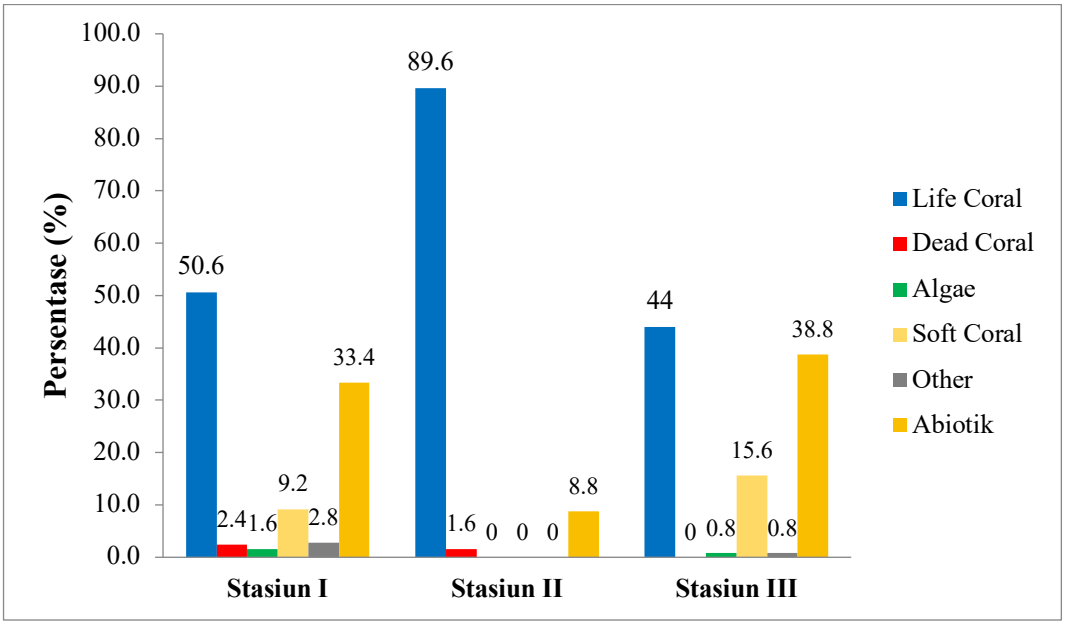

Figure 4.1 Percentage of Lifeform Cover at a Depth of 3 Meters

Based on Figure 4.1, it shows that the condition of coral reefs at 3 observation stations at a depth of 3 meters is in the moderate to very good category. Very good conditions were found at Station II with a live coral percentage value of 89.6%, good conditions at Station I at 50.6%, and fair conditions at Station III at 44%. Based on Minister of Environment Decree No. 4 of 2001 concerning standard criteria for damage to coral reefs, the percentage of live coral reefs in the medium category is 25-49.9%, in the good category 50-74.9% and in the very good category 75-100%.

The condition of the life coral is in the good category at station I because the location of station I is far from settlements and far from the river mouth so that there is no sediment that will go to that location to damage the life coral. Meanwhile, station II is in very good condition because it is also far from settlements so there is a lack of human activity such as mining sand and gravel so there are no complaints and there is a lack of sedimentation. And the locations in the Station I and Station II areas have good brightness, where good brightness will not prevent sunlight from entering the waters so that coral will continue to grow.

The low percentage of coral cover at station III at a depth of 3 meters is caused by high abiotic cover caused by destructive fishing activities (fish bombing) carried out by migrant fishermen around the 1990s to early 2000s around the barrier reef and coral bleaching due to global warming in the early 2000s on the southern coast of Tomini Bay, Gorontalo, as well as sand and

gravel mining and sedimentation due to agricultural activities from land. Bombing was carried out by fishermen so they could get fish quickly and easily (Ilham et al., 2017). Meanwhile, the higher the rate of sediment accumulation, the higher the condition of the ecosystem that will be disturbed by the presence of sediment because it can reduce the penetration of incoming light, thereby slowing or stopping the photosynthesis process of coral reefs (Sidabalok, 2019).

At a depth of 3 meters in Botutonuo waters there are 3 categories of coral cover, namely Branching coral, Massive coral and Algae. The types of coral cover found include massive coral, submassive Acropora, digitate Acropora, sand, soft coral, tabulate Acropora, branching coral and rock. At station I there are 27.20% Branching coral with an appearance frequency of 42, 16.80% Massive coral with an appearance frequency of 28, and 1.60% Algae with an appearance frequency of 3. At station II there are 79.00 Branching corals. % with an appearance frequency of 16, Massive coral was 6.80% with an appearance frequency of 7, and no algae was found. At station III there were 8.80% Branching coral with an appearance frequency of 15, 9.80% Massive coral with an appearance frequency of 11, and 0.80% Algae with an appearance frequency of 1.

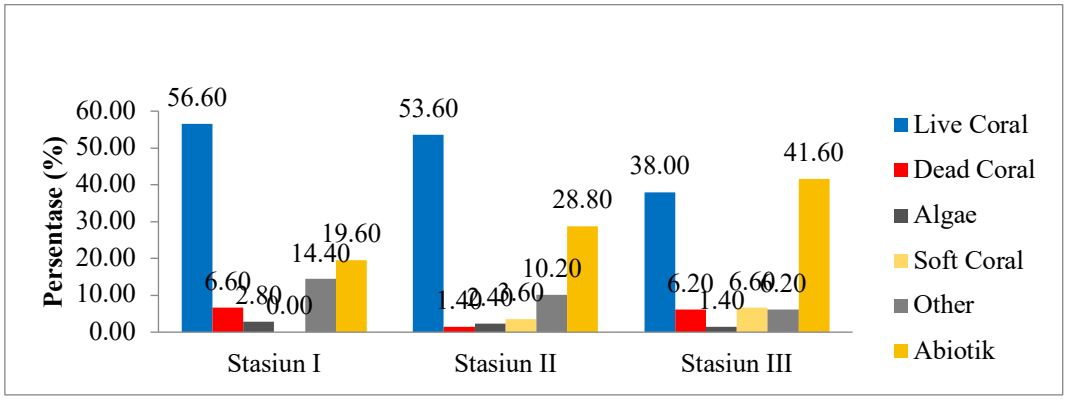

Figure 4.2 Percentage of Lifeform Cover at a Depth of 10 Meters

Based on Figure 4.2, it shows that the condition of coral reefs at 3 observation stations at a depth of 10 meters is in the moderate to good category. Good conditions were found at station I and station II with a life coral percentage value of 56.6% and 53.6%. Medium conditions were found at station III at 38.00%.

Petrosia lignose(giant sponge Salvador Dal) on the Barrier Reef Botu Tonuo which is one of the destinations for domestic and foreign diving tourists in Gorontalo.

Based on the graphic image above, it shows that station I has a good category. Because the location is still far from settlements, there is a lack of fishing activity in mining sand and gravel which means that there is no sediment that will enter the water and damage the coral reefs in the waters. Meanwhile, station II is in good condition and the same thing experienced by station I is the lack of settlements around the tourist area.

The low coral cover at station III at a depth of 10 meters is due to the high abiotic cover and death coral. According to Lalang (2022), the high presentation of abiotic components such as broken coral and dead coral will affect the growth of coral due to sedimentation in the waters, causing death and reducing the brightness of the waters. disrupts coral physiological processes, especially photosynthesis, and causes corals to have to expend large amounts of energy to actively clean sediment from the surface.

Suitability of Snorkeling Tourism

In researching the suitability of snorkeling tourism in Botutonuo waters by considering 7 (seven) parameter indicators, namely coral community cover, type of life form, type of coral fish, water brightness, depth of coral reefs, current speed and width of coral expanses. Based on research results, analysis of the IKW (Tourism Suitability Index) for snorkeling inBotutonuo waters can be seen in Table 4.7 and Figure 4.4

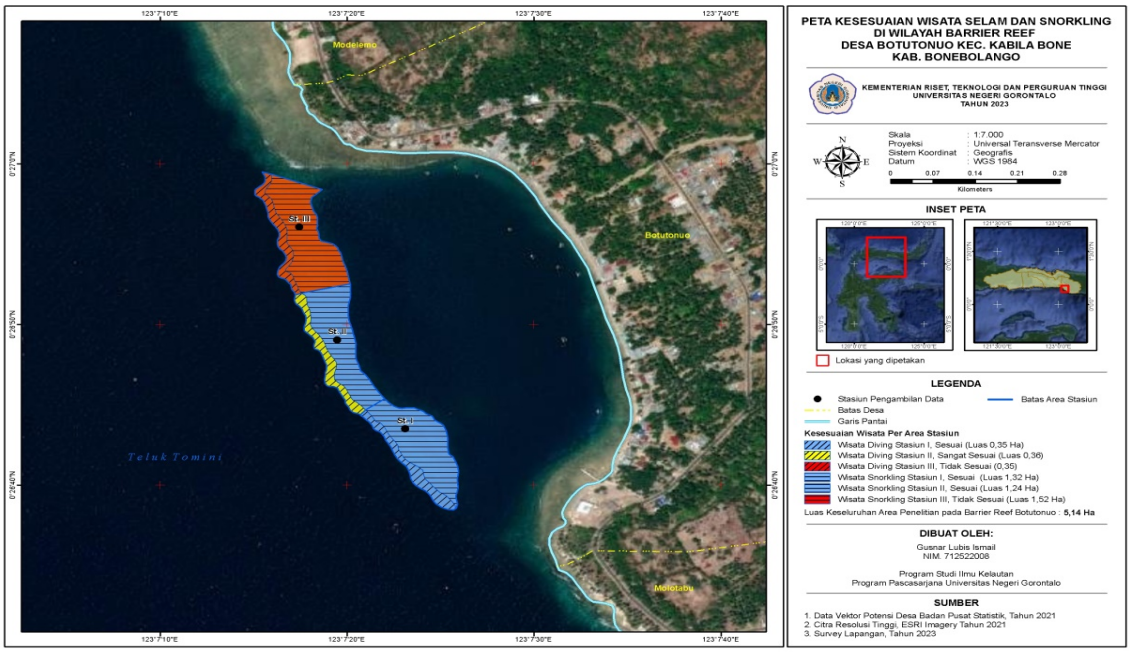

Figure 4.4 Suitability Map for Botu Tonuo Diving and Snorkeling Tourism

Table 4.7 Suitability Index for Snorkeling Tourism

Location	Area (m²)	Mark	Category
		IKW	
Station I	13,200	2.27	In accordance
Station II	12,400	2.33	In accordance
Station III	15,200	1.66	It is not in accordance with

Based on table 4.4, it shows that the entire station at a depth of 3 (three) meters has an area of 40,800 m2 with an IKW value of 1.66 – 2.33 which is included in the snorkeling tourism suitability category and is in the not suitable to suitable category.

Suitability of Diving Tourism

Table 4.8 Suitability Index for Diving Tourism

.Location	Area (m²)	Mark	Category
		IKW	
Station I	3,500	2.31	In accordance
Station II	3,600	2.50	In accordance

Station III	3,500	1.94	It is not in accordance with

Based on table 4.5, it shows that the entire station at a depth of 10 meters has an area of 10,600 m2 with an IKW value of 1.94 – 2.33 which is included in the Diving tourism suitability category and is in the unsuitable to suitable category.

The IKW value at station III is in the category not suitable for snorkeling and diving tourism. This is because the location is close to a settlement where people near the area carry out sand and gravel mining which creates sedimentation. As well as bombing carried out by migrant fishermen during the era. 1980s to 2000s. Apart from that, in this area there is a seasonal river estuary where the river carries sediment from the land, resulting in coral cover at station III.

Regional Carrying Capacity

Botutonuo Beach has an area provided for snorkeling and diving activities. There are three stations and different locations that have been provided for these activities. The carrying capacity of an area can be calculated based on the area whose suitability has been analyzed in relation to the type of activity that will be carried out or has the potential so that the carrying capacity value will be different for each activity.

Table 4.9 Carrying Capacity of Snorkeling Tourist Areas

Location	LP (m2)	Lt (m2)	Wt (Hours)	Wp (Clock)	DDK (Person/Day)
Station I	13,200	500	6	3	53
Station II	12,400	500	6	3	50
Station III	15,200	500	6	3	61

Table 4.10 Carrying Capacity of Diving Tourism Areas

Location	LP (m2)	Lt (m2)	Wt (Hours)	Wp (Clock)	DDK (Person/Day)
Station I	3,500	2,000	8	2	14
Station II	3,600	2,000	8	2	14
Station III	3,500	2,000	8	2	14

The carrying capacity of the area for snorkeling activities varies, namely at station I around 53 people/day and station II around 50 people/day, while the carrying capacity for diving activities at stations I and Station II is around 14 people/day. Meanwhile, at station III, both snorkeling and diving tourism are both included in the unsuitable category. So the total number of diving tourists who can visit the Botutonuo tourist waters is a maximum of 131 people/day. The carrying capacity of an area is influenced by how much of the tourist area is used for an activity. The wider the area, the higher the carrying capacity of each location, because every visitor needs space to observe and enjoy the underwater beauty, whether for snorkeling or diving. According to Ismail et al., (2023) that the size of an area that can be used by visitors considering nature's ability to receive visitors will require a large enough space to carry out activities such as diving or snorkeling to enjoy the beauty of the underwater world.

Botutonuo Marine Tourism Development Strategy

Based on observations and interviews, data was produced which can be seen in Table 4.11 and Table 4.12

Table 4.11

No	Internal factors			
	Strength (Strength)	**Weight**	**Score**	**Total Value**
1	High biodiversity	0.103	3.2	0.3282
2	the underwater beauty is good	0.128	3.3	0.4231
3	Transportation access is very easy	0.103	3.7	0.3795
4	Positive community support	0.128	3.6	0.4615
5	Accommodation is available	0.103	3	0.3077
	Amount	0.564		1,9000
	Weakness			
1	Domestic waste is not managed well	0.103	3.1	0.3179
2	Ecotourism human resources are still low	0.128	2.9	0.3718
3	There is no legality for tourist zoning yet	0.103	3.1	0.3179
4	Infrastructure is not yet optimal	0.103	2.9	0.2974
	Amount	0.436		1.3051

Based on the table above, it shows that strengths and weaknesses have positive numbers. Several attributes of the internal strategic factor of strength show high scores, including transportation access, community support, and underwater beauty. Meanwhile, weak aspects such as domestic waste have a relatively high value. This means that domestic waste at the location has a small impact on tourism conditions.

CONCLUSION

Based on the results and discussion, the conclusions are as follows:

1. The biophysical waters of Botutonuo Village are in good condition as indicated by high diversity index values;
2. The level of land suitability for snorkeling and diving tourism at stations II and III is in the suitable category, while station III at each of these tourism sites is in the unsuitable category;
3. The carrying capacity for snorkelling tourism at station I is 53 people/day and station II is 50 people/day, while the carrying capacity for diving activities at each station is 14 people/day;