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Research Article

The Current Condition of Coral Reef and Fish Diversity in Gosong Island, Southwest Aceh

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Abstract

The coral reef ecosystem is an important ecosystem; its existence has a very close relationship with the surrounding ecosystem and the reef fish community. The direct and indirect dependence of reef fish on coral reefs has become an important issue at the national and international levels. This study aimed to determine the characteristics of coral reef ecosystem conditions, the percentage of coral growth, identify the types of coral reefs, and the diversity of reef fish species on Gosong Island, Southwest Aceh. Coral reef biophysical characteristics were collected by measuring water quality, calculating the percentage of coral coverage using the Point Intercept Transect (PIT) method, and the abundance of reef fish using the Underwater Fish Visual Census (UFVC) method. The condition of average percentage of coral reefs in the waters of Gosong Island was in a good category (55%), found as many as 31 genera of hard corals included in the line transect. The percentage of base substrate that dominates other than live coral is dead coral with algae (DCA) of 28%. The average abundance of reef fish in Gosong Island waters is 11,260 ind/ha with an average reef fish biomass of 2074,095 kg/yield. The water quality results show good conditions for coral growth in location. Based on the analysis of the structure of the fish community found in the coral reef area, the results showed good results, so the research location became a good habitat for various types of fish associated with coral reef ecosystems on Gosong Island

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1. Introduction

Indonesia, a maritime country with thousands of islands as recorded by Susanto *et al.* (2015) has extensive coral reef coverage and has more than 500 species. These resources serve as a major contribution to the development of ecology, aesthetics, economy, and cultural functions (Maragos *et al*., 1996). Coral reef communities can respond to environmental changes (Hallock, 2009; Lam *et al*., 2019), retain high diversity (Allen, 2000; Susanto *et al*., 2015), provide ecosystem services (Moberg and Folke, 1999; ADB, 2014; NOAA, 2021), and have high productivity (Hoegh-Guldberg *et al*., 2019). In fact, the function of coral reefs is defined as having eight interrelated ecological processes, namely: producing calcium carbonate and bioerosion, primary production, providing herbivores, secondary production, predation, nutrient absorption, and nutrient release (Brandl *et al*., 2019). Morais and Bellwood (2020) added coral reefs support many communities and have close relationships with organisms in these communities.

The existence of the coral reef ecosystem is directly related to the surrounding ecosystem, especially the reef fish community. Coral reefs act as the habitat of reef fish (Setiawan *et al*., 2021). This dependence is because coral reefs provide shelter and food sources (Hixon, 2001) and fish are important biotic components that inhabits coral reef ecosystem (Madduppa *et al*., 2012). Various studies have reported that the presence of coral reefs influences the diversity of reef fish (Gerlach *et al*., 2021). For example, based on the location, the diversity of fish species on coral reefs in archipelagic areas is higher than in the lagoon area (Madduppa *et al*., 2012) as well as in the Indo-Australasian archipelago in the Indo-Pacific area where it serves as a center of diversity (Hixon, 2001). Coral reefs have a fairly vast distribution in Indonesia, this distribution is influenced by several factors, namely, temperature, sunlight, salinity, sedimentation, currents, and circulation of seawater, substrate, water quality, and substrate (Sugianto *et al*., 2017). Corals can grow well in marine waters with temperature of 21 – 29ºC (Ampou *et al*., 2021; Isdianto *et al*., 2020; Octavina *et al*., 2021). Coral reefs are classified as very sensitive ecosystems to environmental changes (Fraser *et al*., 2021; Grigg and Dollar, 2021; Satyawan and Artiningrum, 2021; Sweet *et al*., 2021). Healthy coral reef conditions will positively impact fishery productivity, especially reef fish.

Currently, the condition of coral reefs in various locations is experiencing acute stress which threatens their survival (Osborne *et al*., 2011) and causes major disturbances, including in Indonesia. According to Zamani and Madduppa (2011), one of these disorders is caused by various pressures from human activities. Human activities that hurt coral reef ecosystems are overfishing, marine debris, and the ornamental fish trade (Pikulak, 2019). Coral reefs have experienced anthropogenic stress directly or indirectly (Obura *et al*., 2019). Disturbances in coral reef ecosystems can cause damage to populations and species diversity of reef fish (Najmi *et al*., 2021).

In 2016, Pusong Diving Club (PDC) did a survey to see the condition of coral reefs and found that the coral coverage at that time was 48.83%. In the next three years, the coral reefs on Gosong Island increased to 52.62%. This shows that there has been an increase in the percentage of coral reefs over the past 3 years and is a good sign of management in this area. The increase in the percentage of coral reefs is influenced by stable environmental conditions and attention to coral reef management. The local government has designated this area as a conservation area, with fishing and tourism activities. However, overfishing and tourism can put pressure and threaten coral growth. In addition to human activities, aquatic environmental conditions such as waves, earthquakes, and global warming also influence coral growth. This is the reason for regular monitoring of coral reef cover and fish that are directly associated with this ecosystem. With the considerations above, it is important to conduct this research, namely, to conduct regular monitoring to determine the current condition of the coral reef ecosystem, including the coverage and diversity, as well as the diversity of fish that inhabit the coral reef ecosystem in Gosong Island, Southwest Aceh.

2. Materials and Methods

2.1 Study Area

This research was conducted on Gosong Island, Susoh District, Southwest Aceh Regency in May 2021, with three observation stations, namely two points in the eastern part of Gosong Island and one point in the eastern part (Figure 1).

2.2 Procedure

2.2.1 Line Intercept Transect (LIT) method

The point intercept transect (PIT) method by

Hill and Wilkinsen (2004) was used to determine the percentage of coral growth in the form of life form and coral genus along 50 meters with 3 replications. Before data sampling, observations were made by snorkeling to determine the appropriate data collection location. Furthermore, the transect was placed parallel, 50 meters, along the coastline for 3 replications with an interval of 1 m for each transect. Coral specifications were recorded in the form of life form and genus of coral within the transect at every 50 cm (0.5 m) interval (Figure 2). Identification of coral genus was done using the coral identification book by Veron (2000).

2.2.2 Underwater Visual Census (UVC) *method*

The observation of abundance, biomass, and diversity of reef fish were carried out using the Underwater Fish Visual Census (UVC) approach (English *et al.*, 1994). Reef fish species were identified using the Indonesian waters reef fish identification. Reef fish data was divided into two sizes, where fish with a size of > 10 cm were observed in an area of 2 m x 50 m. As for fish with a size of < 10 cm, data collection were done within an area of 2.5 m x 50 m, with depth of 6 m (Figure 3). This data collection was carried out on coral reef transects with 3 replications.

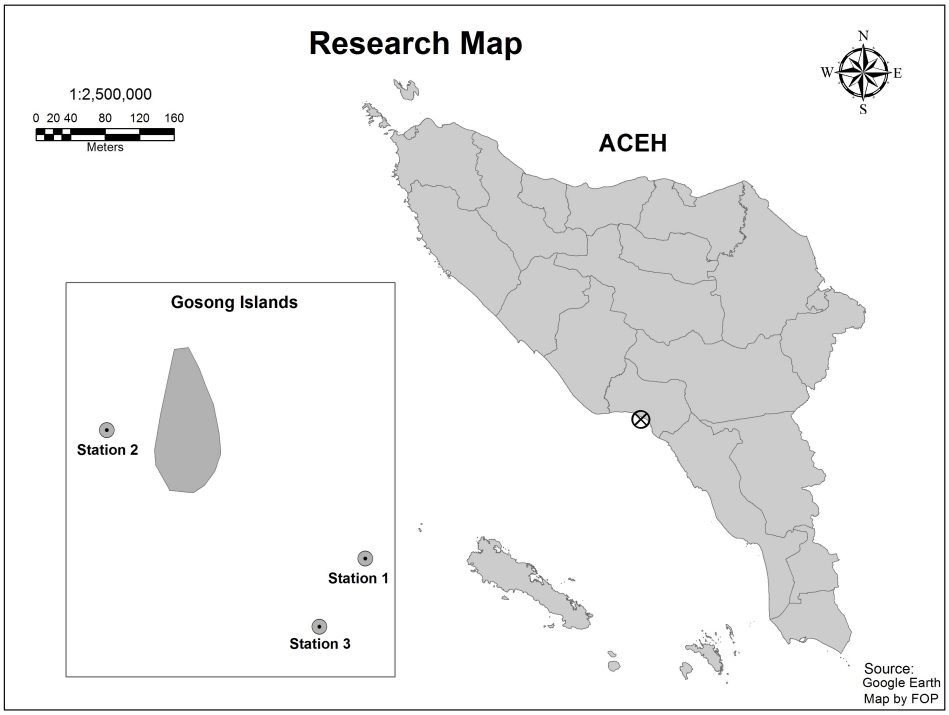

Figure 1. Location of Gosong Island Southwest Aceh, the sampling sites of coral reef station 1 (03°41'48.5" N, 096°49'39.2" E), point 2 (03°41'50.1" N, 096°49'32.0" E), station 3 (03°41'45.5" N, 096°49'37.3" E).

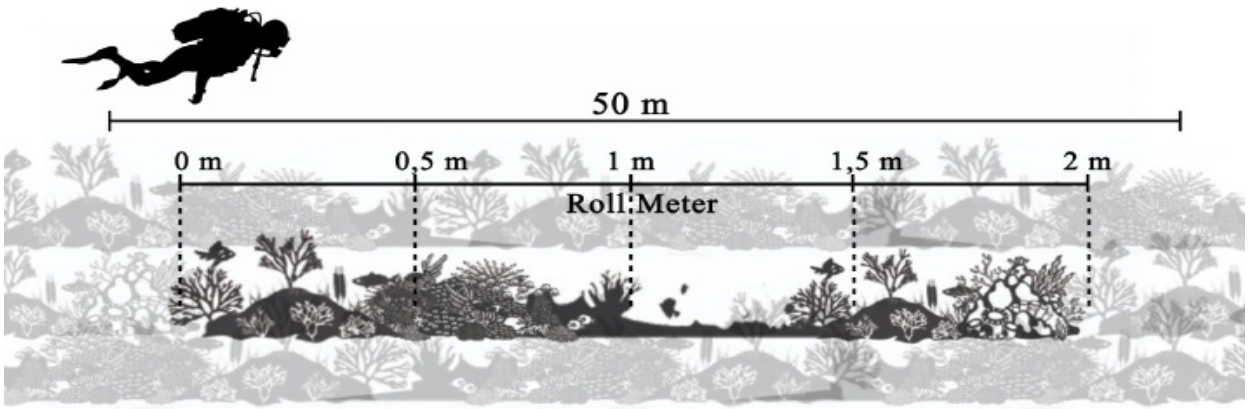

Figure 2. Coral reef data collection

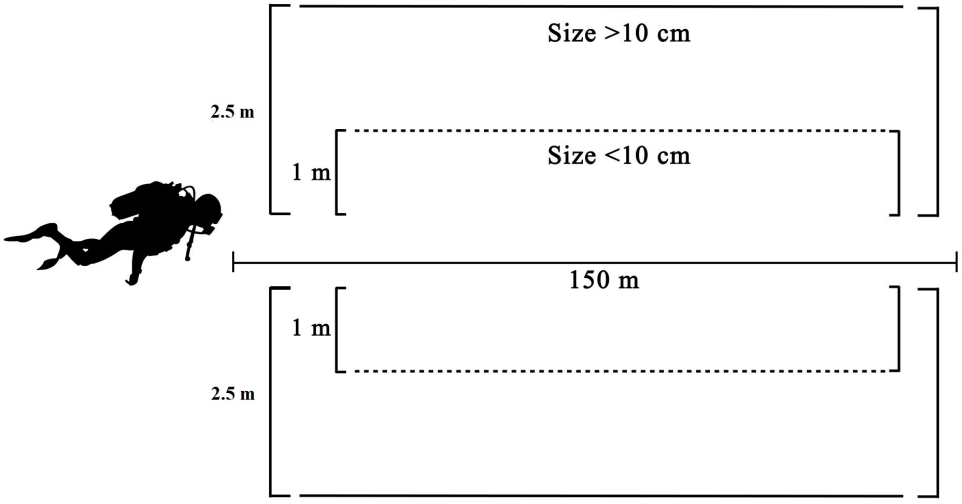

Figure 3. Coral fish data collection method

2.2.3 Water quality measurement

Water quality measurements were carried out with 4 replications for each measurement. Parameter measurements are carried out directly on the spot. These measurements include temperature (°C), salinity (‰), depth (m), and brightness (m). Each parameter were measured with its respective tools: thermometer, refractometer, depth gauge, and Secchi disc. In addition to the parameters above, measurements of DO content and velocity were also carried out. The technique of measuring water quality parameters is carried out in situ with a water sampler placed in a certain container, then measurements were carried out from a boat.

2.3 Analysis Data

2.3.1 Percentage of coral reef cover

Calculation of coral coverage and determination of the category of coral coverage percentage uses the following equation (English *et al*., 1994).

$$Ni = \left(\frac{Li}{N}\right) x\ 100\ \%$$

Description:

Ni = Percentage of coral reef life form (%)
Li = Number of life form points
N = Number of life forms per transect (50 m)

There are 4 categories of coral growth, namely: 0-24.9% (poor), 25-49.9% (moderate), 50-74.9% (good) and 75-100% (very good) (Gomez and Yap, 1988).

2.3.2 Analysis of coral reef fish

Calculation of the abundance of reef fish is done by dividing the number of fish species by the area of data collection. According to Odum (1993), the abundance of fish can be calculated with the equation:

$$N = (\sum n/A)$$

Description:
N = Abundance of reef fish
n = Reef Fish Species (i)
A = Area (50 m^2)

The calculation of the reef fish diversity index according to Shanon-Wiener uses the following equation:

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

Description:
H' = Index of species diversity
pi = Proportion of the number of reef fish of the i^{th} species (Total N = ni/N)
N = Number of individuals of all species
ni = Number of individuals of the i the species
S = Total number of types
i = 1, 2, 3, ..., n

The value of the diversity index (H') ranges from 0-∞, the diversity categories according to Shanon-Wiener are as follows:
H' < 1 = Small diversity
1 ≤ H' < 3 = Medium diversity
H' 3 = High diversity

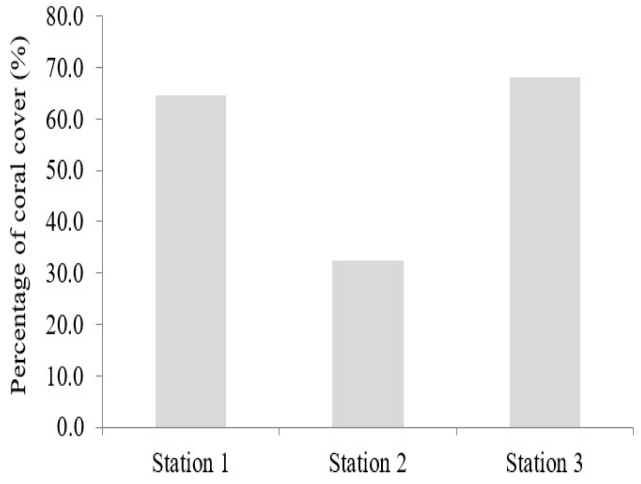

Figure 4. Percentage of coral coverage

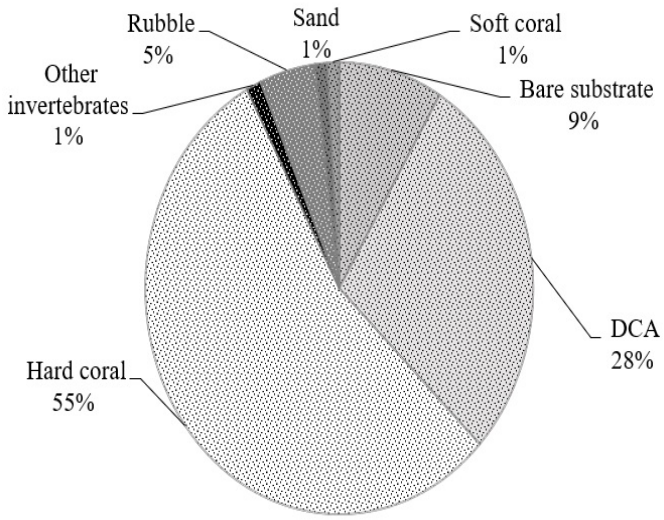

Figure 5. Base substrate cover percentage

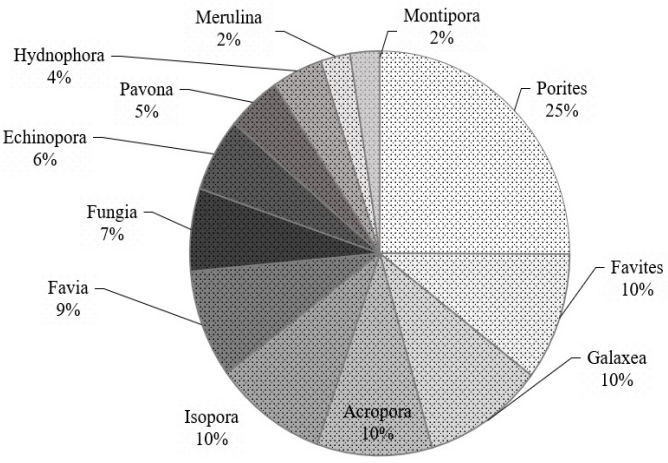

Figure 6. Genus of coral reef percentage

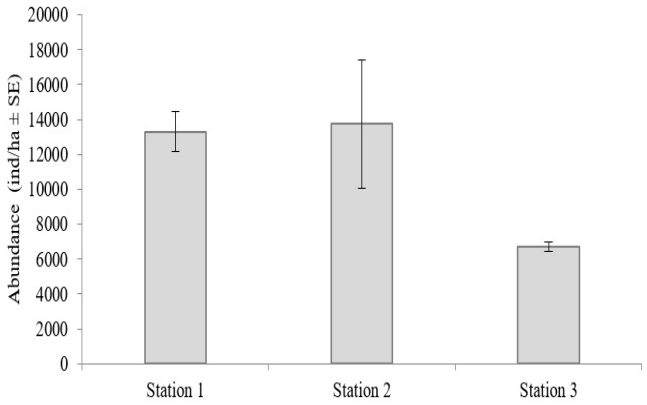

Figure 7. The abundance of coral fish

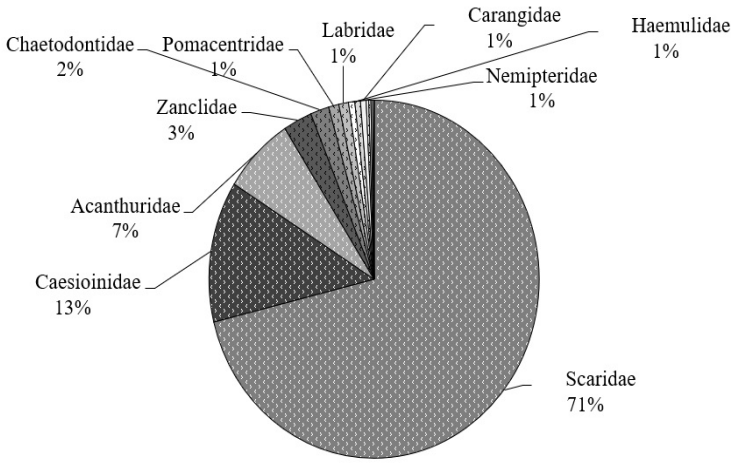

Figure 8. Coral fish family of percentage

3. Results and Discussion

3.1 Results

3.1.1 Coral condition

The results showed that the percentage of live coral coverage in the coral reef ecosystem of Gosong Island at 3 stations had values between 32.2-64.7%. Based on observations, station 3 has a higher percentage than stations 1 and 2, which was 68%. This value is 3.3% higher than station 1 and 35.7% higher than station 2. Station 1 has a percentage value of 64.7%, 32.3% higher than station 2. Station 2 has the lowest percentage of live coral cover of 32.3% (Figure 4).

The high percentage of live coral coverage at station 3 is thought to be due to protected location so current and wave movements are weaker, same goes for station 1. While station 2 is located in the Indian Ocean

current path which is directly affected by ocean currents and waves. This assumption is based on the relationship between the magnitude of currents and waves with coral development. This is in accordance with Giyanto *et al.* (2017) who stated that water conditions that have a direct relationship with strong currents and waves will interfere with coral growth, especially in open areas facing the sea. The results of the research report state that strong currents and large wave from the Indian Ocean are one of the causes of coral fragmentation, especially in corals with branching growth (Abrar *et al*., 2014).

The coral coverage of Gosong Island was found to be approximately of 55%. The results of the analysis showed that coral growth on Gosong Island was categorized as good enough with a coverage of 55%. While the rest was covered with Dead Coral with Algae (DCA) 28%, Stone (bare substrate) 9%, rubble 5%, while sand, soft coral, and other invertebrates each covers for 1% (Figure 5). These results illustrate that the live corals on Gosong Island are in good condition, according to the category defined by Gomez and Yap (1988). The percentage of live coral growth in the Gosong island area tends to be higher than in Unggeh Island Central Tapanuli Regency 12.33-28.54% (Harahap *et al*., 2019), Mansiman Island area, Manokwari 32.44% (Dasmasela *et al*., 2019), Iboh 27.76% (Munandar *et al*., 2019), Bunaken Island 32, 92% (Schaduw *et al*., 2020), and coastal water of Inong Balee in Aceh Besar 50.31% (Najmi *et al*., 2021). However, when compared to the condition of coral reefs on the island of Saebus, Sumenep, East Java, (Rizmaadi *et al*., 2018), the research location has a lower percentage of around 4.2-9.36% and Simeuluecut, Simeulue island of 28.13% (Wisha *et al.,* 2019).

In addition to the live coral coverage, the percentage that has a high range at the study site was DCA. The research location has a lower DCA percentage compared to Tanjung Gelam with 55.3% DCA (Sulisyati *et al*., 2014). However, it is lower when compared to the results of the research by Utama and Hadi (2018) at one site in the Weh Island area, Aceh which has a DCA cover of up to 61.44%. The presence of DCA in coral reef ecosystems will affect coral health (Damhudy *et al*., 2009). DCA at the study site is thought to still provide opportunities for the growth of live coral larvae. This is because coral larvae attached to DCA have a stronger chance to grow compared to an unstable sand or rubble substrate (Utama and Hadi, 2018). The results of the research on Gosong Island showed there are 12 families consisting of 29 genera including Acroporidae (4 genera), Agariciidae (4 genera), Faviidae (9 genera), Fungiidae (3 genera), Merulinidae (2 genera), Mussidae (2 genera),

Table 1. Family and genus of coral reef in Gosong Island

No	Family	Genus
1	Acroporidae	*Acropora*
		Montipora
		Astreopora
		Isopora
2	Agariciidae	*Pavona*
		Gardineroseris
		Coeloseris
		Pachyseris
3	Faviidae	*Diploastrea*
		Barabattoia
		Leptoria
		Favites
		Montastrea
		Favia
		Leptastrea
		Platygyra
		Echinopora
4	Dendrophylliidae	*Turbinaria*
5	Fungiidae	*Fungia*
		Ctenactis
		Zoopilus
6	Merulinidae	*Hydnophora*
		Merulina
7	Mussidae	*Acanthastrea*
		Symphyllia
8	Oculinidae	*Galaxea*
9	Pectiniidae	*Pectinia*
10	Pocilloporidae	*Pocillopora*
11	Poritidae	*Porites*

Dendrophylliidae Oculinidae, Pectiniidae, Pocilloporidae, and Poritidae each consisting of 1 genus (Table 1). The greatest diversity of species was found in the family Faviidae (9 genera). The genus was found with more frequency than other genera, namely Favia and Favites. In the coral reef ecosystem in P Gosong, Southwest Aceh, Family Faviidae has 3 genera with percentages between

6-10%. Faviidae is a coral group that is widely distributed in Indo-Pacific waters (Kongjandtre *et al*., 2012), and its presence has been reported in the southern Persian Gulf, the Gulf of Aden, Southeast Africa, and the Persian Gulf (Moradi *et al*., 2010). Reports related to its presence in Indonesian territory have been based on several research results by Nurhaliza *et al*. (2019) in the intertidal zone of the Mandalika coast, Central Lombok, which has a percentage of up to 79%. Family Acroporidae, and Agariciidae are found with the same number of genera, namely 4 genera. While the other families found less than 3 genera in each family.

Family Poritidae in the results of this observation recorded the presence of 1 Porites genus (Table 2). This genus is most commonly found with a frequency of 110 with a percentage of 25% (Figure 6), mostly found in the form of massive coral. Porites are genus with the slowest growth but have the highest survival rate (Nybakken, 1992). It is suspected that its presence is abundant in the research location due to suitable water conditions. Porites corals are the most common corals because they can survive in various water conditions such as high salinity and high sedimentation (Morton, 1990). In addition to this genus, the observation found other genera with a percentage of 9-10%, namely Favites, Galaxea, Acropora, and Isopora (Figure 5). The low percentage of the presence of this species is thought to be caused by the environment. In addition, it is suspected that there is pressure due to fishing, because there are fising activities around the area. The continuous fishing process, especially for reef fish, will cause changes in the structure of the fish community. Reports signifying changes in size structure, diversity, and trophic composition could be a sign of coral decline (Graham *et al*., 2008).

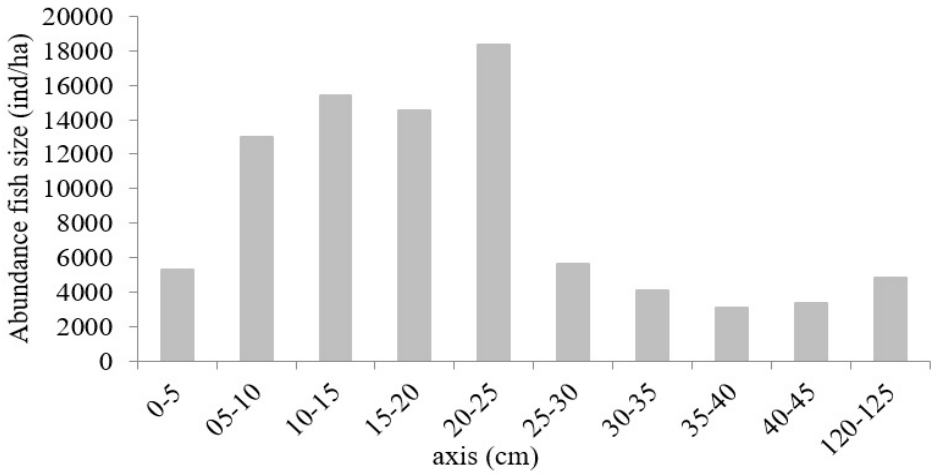

Figure 9. The size of the fish that often appears

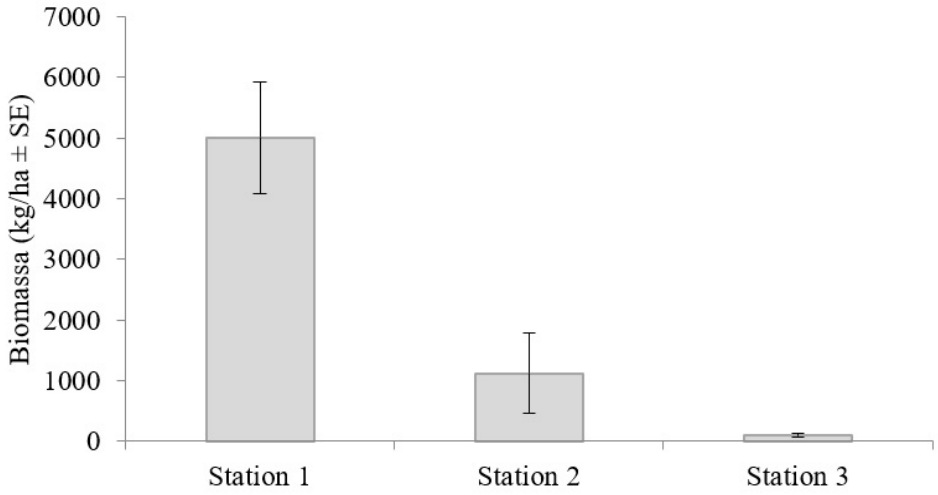

Figure 10. Biomass of reef fish in Gosong Island, Southwest Aceh

Table 2. Water quality in Gosong Island, Southwest Aceh (SE±0,61)

Station	DO (mg/L)	Salinity (ppt)	pH	Temperature(°C)	Brightness (m)	Velocity (m/s)
Station 1	7.71	31.75	7.71	30.88	15.06	0.22
Station 2	6.25	30.25	7.83	31.98	6.08	0.18
Station 3	5.65	31.25	7.52	31.51	1.28	0.26

Furthermore, the family which has a percentage of 4-9% consists of 4 genera consisting of Hydnophora, Pavona, and Echinopora. Fungia and Favia were found to be more than 7%. Hydrophora and Merulina are members of the Merulinidae family, both of which were found in the research location with a low percentage compared to other genera. The family Agariciidae found at the study site consisted of 4 genera, namely Pavona, Gardineroseris, Coeloseris, and Pachyseris. Agariciidae has been reported to be found with 22 genera included, in the waters of Pulau Layang-Layang, Sabah, Malaysia. There are 6% of Echinophora genus based on observations. This species is a member of the family Faviidae, known as one of the original genera in southern Europe and Algeria (Mokni, 2020). The genera Merulina and Montipora were present at the study site with a percentage of 2%. Merulina has the form of sheet growth while Montipora had an encrusting growth (Siringoringo *et al*., 2012).

3.1.2 Abundance and diversity of coral fish

Based on 33 observation stations, the average abundance was 11.260 ± 2273.88 ind/ha (Figure 7). The highest abundance of reef fish was found at station 2 with an abundance of 13,760 ± 3680 ind/ha and the lowest abundance was at station 3 with a value of 6,720 ± 260 ind/ha. The abundance of this fish is higher when compared to the study of Fazillah *et al*. (2020) in Lhok Mata Ie, which is 5,311.71 ind/ha.

The identified reef fish species in Gosong island Southwest Aceh consisted of 16 families, 36 genera, and 55 species. The family that has the most species is Chaetodontidae and Labridae which have more species than other families. In addition to the two, some families have a total of 6 species, namely Acanthuridae and Caesioinidae. Chaetodontidae or butterflyfishes whose existence is strongly influenced by substrate coverage in coral reef ecosystems because this species utilizes this ecosystem to find food. Nanami (2020) emphasizes based on the results of his research that the various types of substrates, namely various live corals, and non-coral substrates, affect spatial distribution and foraging places. A significant correlation was also obtained from the number of relationships of certain species of this type of fish with certain substrates (Temraz and Zaid, 2005). The Labridae family includes fish species which distribution is widespread in the coastal areas of India, the Pacific, and the Atlantic Ocean (Skiftesvik *et al*., 2015). Fish of the Achanturidae group are herbivorous fish with an important role as the first consumer (Hernández-Landa and Aguilar-Parera 2018). This type of fish will affect the composition of algae in the coral reef system so that herbivorous fish can also be used as bioindicators of coral reef health (Faizal *et al*., 2012). According to Rajan and Sreeraj (2013), Caesionidae consists of 4 genera which are distributed in the Indo-West Pacific, the Red Sea east coast in Africa to Japan, and Australia to Samoa island. At the research site, there are 2 genera, namely Caesio (*Caesio caerulaurea, Caesio cuning, Caesio xanthonota*) and Pterocaesio (*Pterocaesio chrysozona, Pterocaesio digramma*, *Pterocaesio tile*).

The analysis carried out related to the diversity of reef fish on Gosong Island determined that the diversity was categorized as high diversity with a value of 3.6 with a category value of H' > from 3. The uniformity index was high with a value of 0.9. Meanwhile, the dominance index was low with a value of 0.03 that is 0 < C < 0.5. This value indicates that there is a match between the level of diversity and dominance of reef fish, where the value of the diversity index will be inversely proportional to the dominance index. The results of the analysis of 16 families showed that the Scaridae family was the most frequently encountered, which was 71%, while the least encountered family was the Apogonidae family, which was 0.001% (Figure 8). The abundance of reef fish from families other than scaridae is not more than 13%. Fish Family Scaridae are classified as reef fish commonly referred to as Cockatoo fish. Parrotfish is one of the herbivorous fish that uses coral reefs as a habitat and a place to feed (Nybakken, 1992). Family Cae-

sionidae is present (13%) with 2 genera and 6 species. On Pulau Gosong, this presence was found because according to Carpenter (1987), this species is ubiquitous in Indian Ocean. The family Acanthuridae has 3 genera Acanthurus (3), Ctenochaetus (2), and Zebrasoma (1), with a total of 6 species. Zaclidae has a percentage of 3% with 1 genus and 1 species (*Zanclus cornutus*). Chaetodontidae found (2%) consisting of the genus Chaetodon (*Chaetodon andamanensis, Chaetodon rafflesii, Chaetodon triangulum, Chaetodon trifasciatus, Chaetodon vagabundus*), Forcipiger (*Forcipiger flavissimu*), and Heniochus (*Heniochus pleurotaenia*). Pomacentridae, Labridae, Nemipteridae, Haemulidae, and Carangidae are genera with presence of 1%, and the rest are below 1%, namely the genera Apogonidae (0.054%) and Priacanthidae (0.177%).

The abundance of reef fish sizes found at the study site varied greatly (Figure 9). The size of fish that is mostly found is fish measuring less than 30 cm, which is between 20–25 cm/ind and the smallest number of fish was fish with a size of 35-40 cm/ind (Figure 8). The average abundance of reef fish biomass on Gosong Island is 274.1 ± 1496.4 kg/ha The highest biomass is found at station one with a value of 5007.6 ± 4327.75 kg/ha and the lowest biomass is at station three with biomass of 93,4 ± 29.8 kg/ha (Figure 10). The average abundance of reef fish biomass in the research location is higher than in several other locations that have been researched, such as Putra *et al.* (2019) in Mangosteen waters of Karangasem, Bali and Fazillah *et al.* (2020) in waters of Ujong Pancu Aceh Besar.

3.1.3 Water quality

The water conditions in the waters of Gosong Island have the characteristics of dissolved oxygen (DO) 5.65 – 7.71 mg/L, salinity 30.25 – 31.75 ppt, acidity (pH) 7.52 – 7.83, temperature 30.88 - 31.98ºC, the brightness (light penetration) of the waters range from 1.28 to 15.06 m, and the current velocity is 0.18-0.26 m/s (Table 2). Environmental parameters of coral reefs in the Gosong Island waters are still supportive for the life of coral reefs and reef fish. These results illustrate that the water conditions are relevant to being a place for coral reefs conservation. This is in accordance with the opinion of Hinson (2016) that poor water quality can cause stress on corals. In addition, poor water quality can reduce the thermal tolerance (bleaching resistance) of symbiotic corals (Hoegh-Guldberg *et al*., 2017). Extensive coral bleaching damage and coral reef mortality can be caused by anthropogenic factors (Wooldridge, 2009).

3.2 Discussion

Based on the study results, the condition of coral reefs in Gosong Island is in good condition. This good condition is shown by the coral coverage value of 55%, DCA of 28%, the base substrate of 9%, and Rubble 5%. A coral cover of 55% is sufficient to provide peace for related parties including researchers because it can be concluded that this condition is good in terms of management. However, it is our homework to do regular monitoring so that the current coral cover can be increased, at least maintained. The current coral cover is needed because the observation location is a coral reef conservation location in the Southwest Aceh district, so it always gets supervision from regional officials. In addition, the observation area is in the Indian Ocean, so it is necessary to pay attention to the physical condition of the ocean. According to Siringoringo *et al.* (2012), the magnitude of the waves will affect the growth of coral reefs

The number of 51 species of reef fish in the waters of Gosong Island, Southwest Aceh indicates that these waters have a high biodiversity of reef fish (Table 2). The number of families found in the research location is higher than the results of the study from Raja Ampat (Pangabean, 2012; Edrus and Lestari, 2020). The diversity of fish species in the research location illustrates that the coral reef ecosystem of Gosong Island is an ecosystem that provides a food source, spawning ground, and is an area with good nutrition. This is evidenced by the high diversity of fish; the high diversity of fish species is a benchmark for the condition of coral reefs. This statement stems from the idea that a high number of fish species means that this ecosystem can provide all types of food needed by various types of fish. The current percentage combination can show that this ecosystem is good including those related to DCA, sand, stone, and rubble. This is in line with research by Cassata and Collins (2008) that there is a correlation between reef morphology, previous substrate types, coral communities, and other obstacles such as waves and tides. So that the results of this study can be used as the basis for conservation management with actions, namely monitoring. This ongoing monitoring activity results are expected to be a knowledge base for further management follow-up.

The suitability of water quality conditions with quality standards indicates that the water quality at the research site is suitable for the organisms that inhabit the area, both for coral reefs and reef fish. Gosong Island's coral coverage is better when compared to some

other areas, despite the big wave due to being located in the Indian Ocean. This proves that the role of water quality is great enough to compensate for the physical conditions of the research site. Good water quality supports the existence of coral reefs or reef fish, which is important for management considerations in synergy with the surrounding land environment. The management synergy between the waters (Gosong Island) and the land area is very important so that it will become integrated ecological-social-economic management. These three points are important in order to maintain water quality at the site. This is because water quality can receive impacts from land (social and economic activities of the community). As revealed by the research of Wooldridge (2009) that poor water quality from anthropogenic activities can cause damage to coral reefs and are unable to withstand repeated declines in water quality (Wenger *et al*., 2015).

4. Conclusion

The percentage of coral growth on Gosong Island is classified as good, namely 55%. The bottom substrate consists of 28% Dead Coral with Algae (DCA), 9% bare substrate, 5% rubble, sand, soft corals, and other invertebrates, each by 1%. The highest percentage of live coral growth was at station 3, which was 68%, followed by station 1 with a percentage value of 64.7%, and station 2 was 32.3%. At the research site, coral from the genus Porites found in large numbers, while the most abundant life form was found in the form of massive coral. The coral reefs of Gosong island are ecologically beneficial as a foraging area for food. This is evidenced by the coral reef ecosystem in the research location of 16 families, 36 genera, and 55 species of reef fish. Based on the structure of the reef fish community associated with the coral reef ecosystem of Gosong Island, the stability of the ecosystem at the study site was assessed to be in good condition. The next recommendation as a management effort in the form of conservation of the coral reef ecosystem of Gosong Island is to carry out regular monitoring of the related parties.

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Author's Contribution

The contribution of each author as follows, Nurul Najmi; collected, processed, analysed the data, and drafted the manuscript. Ananingtyas S. Darmarini; devised the main conceptual ideas and critically revised the article. Nanda Muhammad Razi; data processing and designed the figures. Mai Suriani; text editor. Samsul Kahar; data collection. All authors discussed the results and contributed to the final manuscript.

Conflict of Interest

The authors declare that they have no competing interests.

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