ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

# Seaweed Community Structure in the Waters of Kelombok Village, Lingga District, Linga District

**Zahara Nurmakassing, *Eddiwan, Efawani**

**Laboratory Aquatic Biology. Department of Aquatic Resource Management, Faculty Fisheries and Maritime Science. Riau University. Campus of Bina Widya.**

***Correspondence Author**

**DOI:** https://doi.org/10.51244/IJRSI.2024.1107078

**Received: 20 June 2024; Revised: 06 July 2024; Accepted: 09 July 2024; Published: 20 August 2024**

## ABSTRACT

Kelombok Village, Lingga Regency is an island with a large water area (99% of the water area) and has a high wealth of biological resources, especially algae or seaweed. This research was conducted in the coastal waters of Kelombok Village with three stations (stations 1, 2, and 3), and two zones (tide zone and low tide zone). The research was carried out for one month, namely in January 2024. Sampling was carried out using the line transect technique. Data analysis was carried out descriptively. Based on the research results, it is known that 12 types of seaweed live in the coral coastal waters of Kelombok Village, consisting of 3 types of green algae (Chlorophyta), 4 types of brown algae (Phaeophyta), and 5 types of red algae (Rhodophyta). The abundance of seaweed in zone A is 99,913 ind /m2, and in zone B is 99,981 ind /m2. Water conditions were recorded for brightness 1-1,7 m, temperature 29-30,1 ºC, salinity 29,5-30‰, current speed 0,071 m/sec, DO 6,78-7,23 ppm, depth 0,75-1,7 m, pH 7,8-8, nitrate 0,01 mg/l, and phosphate 0,073 mg/l.

**Keywords:** Identification Of Types, Abundance, Marine Ecosystems, Quality of Coral Waters, Kelombok Village

## INTRODUCTION

Regency Phallus has a diverse ecosystem and very high germplasm, especially resource grass marine (macroalgae). The Grass Sea has been a long time since it materialized food and a livelihood for people on Kelombok Island. In some grass areas, the sea is the main livelihood (Sarita et al., 2021). The distribution area of seaweed in Indonesia reaches 1.2 million hectares and this is the largest in the world (Priono, 2016). In Indonesia it is recorded There are 911 species, 268 genera, and 89 families (Handayani, 2021), while in the world it is recorded there are 8,000 species of grass sea.

Seaweed is a plant that consists of one or many cells, forms colonies, and lives benthic in shallow, sandy, or muddy water areas. (Sunarernanda, Ruswahyuni & Suryanti, 2014). Seaweed has a role as a support for the basic substrate and a carbonate provider to maintain the balance of coral reefs. According to Subaryanti et al., (2013), Seaweed plays a role in supporting the need for food and improving industry. This shows that seaweed is a marine biological resource that has an ecological role and economic value (Satheesh & Wesley, 2012; Chaves *et al.*, 2013)

Grass The sea as marine vegetation has a diversity of species that is very abundant in shallow sea waters (Sodiq & Arisandi, 2020), one of which is in Kelombok Village. Kelombok Village is something priority area. For developing resource grass sea in the Regency Phallus. This region is Still clean, and not yet polluted, so resource biological Still can live fertile without being disturbed. However, Making the area, a grass village sea, still required Lots of complete and accurate information, such as information type, abundance, structure commodity grass sea, and aspect other. Information This is needed by factories and industrial uses development marketing and utilization to front. For researchers' natural information, is very useful For studying more carry on about management and utilization of grass sea This is at the front. For complete

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

existing information moment This is about grass in the sea in the Kelombok area so study This done.

## RESEARCH METHODS

Study This was implemented in the month of January 2024 in Kelombok Village, Kecematan Lingga, Regency Lingga, Province Riau Islands (Figure 1). A study was done at the time down at four stations and two zones. that zone consists of the zone no submerged moment receding sea water (zone A) and submerged zone or shallow moment receding sea water (zone B). For activity identification type grass sea will carried out in Kelombok Village, and measurements of water quality will carry out in the field and the laboratory.

The method used in the study is method survey and calculation abundance using plot quadrant size (1x1 m) and line transect. Method survey that is with observation in a way directly in the field. Whereas calculation abundance done with method put quadrant in a way random throughout line transect from direction lips beach direction ocean. Collected data includes primary and secondary data. Primary data consists of type data, abundance of grass ocean, and water quality. Meanwhile secondary data from journals, and online literature on line linked offline with the study.

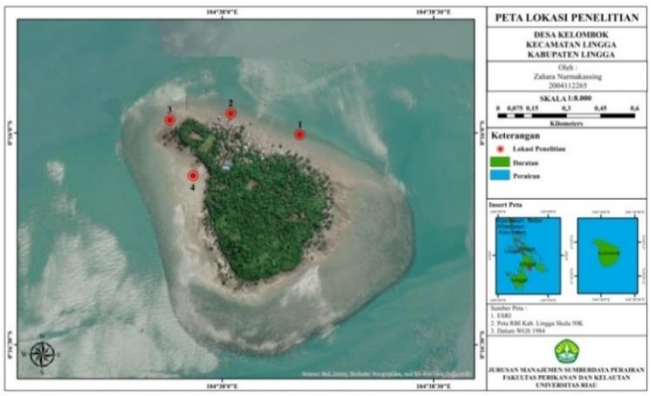


Figure 1. Map of research locations

Sample macroalgae were collected, preserved using alcohol, and then placed in plastic samples to be identified. Sample grass sea identified based on characteristic morphology, like shape, color, and size. Type grass sea is known based on results identification, so on analyzed in a way descriptive. Whereas aspect measured water quality covers brightness, temperature, salinity, depth, DO, speed current, pH, nitrate, and phosphate.

### Data Analysis

This type of research is descriptive research, namely research that attempts to describe research activities carried out on certain objects clearly and systematically (Darmadi, 20011). The subjects of this research are all types of seaweed found in the natural ecosystem of Kelombok waters, the object of this research is a diverse type of grass sea contained in the ecosystem experience Kelombok waters.

The Method Used in the Study This is the method of observation and methods of interview. Method observation used for observing in a way direct diversity type grass sea. This data was collected with technique documentation Photo observation. Method interview done to get information addition about the observed object is obtained from farmer grass sea in a way directly collected with do recording results interview. After the activities Data collection is complete, then the step furthermore analyzes a way descriptive presented in the form table and then described as well as supported with Photo grass sea results observation.

### A. Identification Type

Activity This started with determination location study and sampling. Location Determination and Collection Sample Method used in the study. This is a method descriptive with taking samples using line transects square (1 x 1 meter) (Soelistyowati, et. al., 2014). Transect created in study This a total of 4 transects, each of which

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

was placed in the water's coastal littoral zone (tidal area), and neritic zone (sea shallow). Method transect square done with method draw a vertical line straight. Then above that line plots measuring 1 x 1 m were placed, totaling 5 plots placed on each transect, the second stage is to identify types of seaweed, meanwhile, the environment and its waters such as pH, temperature, and salinity observed with the help tool.

Identification Grass Sea After taking a sample, continued with the identification process. Sample macroalgae identified with notice characteristics or characters that exist in each sample macroalgae. Development Brochure Stages Furthermore done development results study becomes a brochure. As for the development brochure, this uses the 4D technique. As for the inside study, the researcher used four stages, namely: 1) define (definition: stage. For define and define); 2) design (design: aims for designing device); 3) develop (development: stage for produce product development); and 4) disseminate (dissemination: stage for disseminate results study)

**B. Relative Abundance of Grasses Sea**

Relative abundance of individual grasses the sea is defined as the percentage of the number of individuals in a particular area, calculated using the following formula:

$$KR = \frac{Ni}{N} \text{ x } 100\%$$

Information :

KR = Relative Abundance

Ni = Number of Individuals

N = Total number of individuals per observation station

Abundance level criteria (%):

0 = none

1-10 = less abundant

11-20 = abundant

> 20 = very abundant

**C. Diversity Index**

Species diversity can be said to be an indication of the many types of grasses sea and how the number of individuals is distributed in each type and sampling location. To determine diversity, it is calculated using the Shannon-Wienner formula (Odum, 1993) as follows:

$$H' = -\sum_{i=1}^{i} Pi \; in \; Pi$$

Information:

H' : Species Diversity Index

n i : Number of individuals of type i

N : Total number of individuals

S : Number of genera that make up the community

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

Pi :$\frac{ni}{N}$

Range of Water Stability Based on Diversity Index:

0 < H' < 1 Low (unstable)

1 < H' < 3 Medium

H' > 3 High (stable)

**D. Uniformity Index (E)**

Uniformity can be said to be balanced, namely the composition of individuals of each type found in a community. To calculate species uniformity, can be calculated using the following Evennes formula (Odum, 1993):

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

Information :

E : Uniformity Index

H' : Diversity Index

H max: Maximum species diversity (ln S)

Where:

e < 0 : The level of population uniformity is small

0 < e < 1 : Medium level of population uniformity

e > 1 : Large population uniformity level

**E. Dominance Index**

For count index dominance used formula Odum, (1993) as following:

$$C = \left(\frac{ni}{N}\right)^2$$

Information :

C : Index Dominance

Ni: Amount individual species i

N: Total number of species

## RESULTS AND DISCUSSION

From the identification results, 1 2 were obtained types of seaweed, which consist of 3 types of green algae (Chlorophyta), 4 types of brown algae (Phaeophyta), and 5 types of red algae (Rhodophyta). Type of green algae (Chlorophyta)found among others, namely Neomeris annulata, Chaetomorpha crassa, and Ulva lactuca. Types of brown algae found that is Padina Australis, Sargasum sp, Sargasum natans, and Turbinaria ornate. Types of red algae found that is Gracilaria salicornia, Acanthopora spicifera, Gracilaria blodgetti, Gracilaria verrucosa, and Eucheuma spinosum (Table 1).

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

Table 1. Types Grass The sea in Kelombok Village

| No. | Type Grass Sea | Sta.1 | Sta.2 | Sta.3 | Sta.4 |
|---|---|---|---|---|---|
| 1. | *Gracilaria saricornia* | √ | | √ | √ |
| 2. | *Padina autralis* | √ | √ | √ | √ |
| 3. | *Achanthopora spicifera* | | | √ | √ |
| 4. | *Neomeris annulate* | | | √ | √ |
| 5. | *Sargasum sp.* | √ | √ | √ | √ |
| 6. | *Gracilarian blodgetti* | | | √ | √ |
| 7. | *Chaetomorpha crassa* | | | √ | √ |
| 8. | *Sargasum Natans* | √ | √ | √ | √ |
| 9. | *Ulva lactuca* | | | √ | √ |
| 10. | *Turbinatia ornate* | | | √ | √ |
| 11. | *Gracilaria verrucosa* | | | √ | √ |
| 12. | *Echeuma spinosum* | | | √ | √ |

Characteristics grass sea found in waters Kelombok village in a way morphology seen in Table 2.

Table 2. Character Morphology Macroalgae

| No | Species name | Characteristics Morphology | | | |
|---|---|---|---|---|---|
| | | ***Thallus* shape** | **Color *thallus*** | **Branching *thallus*** | **Type *holdfast*** |
| 1. | *Gracilaria salicornia* | Cylindrical, nodules | Brownish red | Ditetrachotomous | Disc small |
| 2. | *Padina autralis* | Like fan | Chocolate young | No branching | Shaped disc |
| 3. | *Achanthopora spicifera* | Cylindrical | Pink in the tip, yellow in the basal part | Polystichous | Shaped disc |
| 4. | *Neomeris annulate* | Cylindrical | Green at the tip and white in the basal part | No branching | Plate wet |
| 5. | *Sargasum sp.* | cylindrical | Brownish green, brown old | Tetratichous | Shaped disc |
| 6. | *Gracilaria blodgetti* | Cylindrical | red dark, yellow, brown young | Ditetrachotomous | Shaped disc |
| 7. | *Chaetomorpha* | Filamentous, | Light green | No branching | Rhizoids |

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

| | | | | | |
|---|---|---|---|---|---|
| | *crassa* | fiber No orderly | | | |
| 8. | *Sargasum Natans* | Cylindrical, spiny small | Chocolate old, brown young | Tetratichous | Shaped disc |
| 9. | *Ulva lactuca* | Sheet form grove | Bright green | No branching | Shaped disc |
| 10. | *Turbinatia ornate* | Shaped crpeople with fringe jagged | Chocolate light, brown old | Ferticillate | Shaped disc |
| 11. | *Gracilaria verrucosa* | Cylindrical | Yellow brownish, red young | Ditetrachotom ous | Shaped disc |
| 12. | *Echeuma spinosum* | Cylindrical | Chocolate | Polystichous | Shaped disc |

According to (Mallin et al., 2000), the grass sea has been used as an indicator biological health ecosystem in many monitoring programs around the world. these programs have used various methods to measure the structure of community macroalgae (González-Gurriarán et al., 1998). In Europe, the European Union Directive recently. This push development index as a tool for monitoring the quality ecology system coast. In geographic areas, some big study focuses on mapping the distribution of grass sea or Fucales (Lan et al., 2012). This matter shows the necessity to align monitoring macroalgae sea, identify metrics and approaches generally in design taking samples measurements field, resolution taxonomy, and data management, for develop procedure standards that allow the data to be obtained for compared to (Lapointe et al., 1987).

In this coastal region of North and South Carolina is something sloping plains, there are estuary rivers large areas, lagoons, and swamps salty. Condition. This difference in geographical Kelombok beach is the beach does not flow by river water. The most striking feature is a voice known as large and closed as The Albemarle-Pamlico Estuary System, which includes about 7530 km2. Coastal also has Lots of estuaries and a long tidal river range between 1 and 10 km (Rasher et al., 2017). Coastal This has a growing population fast and resourceful greatly increased pollution (Zydlewski et al., 2011).

Sector Agriculture is an important thing for the area, especially farms increasing pigs quadrupled in the 1990s. Community phytoplankton estuaries in North Carolina have been studied with Good; group the most important taxonomy are diatoms, dinoflagellates, cryptomonads, and cyanobacteria. Several estuaries mainly flow the water bad nature eutrophic Because input nutrition, and dinoflagellates poisonous (Pfiesteria spp.) can reach density high in nutrient-rich areas (Wu et al., 2015). Complete waters sea is relatively oligotrophic (Arthaud et al., 2012). Species south enter through intrusion lower surface, whirlpool, and sometimes ring Current Bay, temporary species waters cold enter together Genre Labrador Current to the Cape Hatteras region (Lee *et al.*, 1991).

Carolina has several macroalgae with low endemicity, however, the diversity of species is Possibly high in the area transition, which represents the southernmost extension for several adapted species with cold and northernmost expansion from adapted species with warm (McCook, 1999). In North Carolina, the dominant seagrass, Zostera marina, is located in the southernmost part, whereas the species second, Halodule wrightii is in the northernmost part. Common Widgeon Grass Ruppia maritima was found, growing in brackish water or pool salinity low in the swamp salty (De Paula *et al*., 2003).

In the area, this is a plant Seagrass has been greatly reduced, perhaps Because nitrogen increases and increases sedimentation (Freeman *et al.*, 2008). By common, taxa dominant benthic in a way numeric covers bivalves, polychaetes, and amphipods, many show gradient-type communities from the mesohaline region on the coast east until salinity near the sea in the west (Edwards *et al*., 2017). The semi-enclosed estuary has fishery broad shells, esp crab blue, northern quahog, oyster eastern, and shrimp. The problem includes contamination of

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

several sediments with substance poisonous, esp metal and PCB at a sufficient level tall so which hinders the growth of several macroinvertebrates benthic (Abe *et al.,* 1996). Many fish died because of an epidemic of dinoflagellates poisonous, and the death of fish as well as Habitat loss is caused by hypoxia and anoxia episodic in rivers and estuaries (Marescaux *et al.,* 2010).

**A. Abundance Grass Sea Kelombok Village**

Based on the results of the analysis, the abundance of seaweed is 2 The research zone shows differences in abundance values (Table 3).

Table 3. Abundance Type Grass The sea in Kelombok Village

| No. | Type Grass Sea | Zone | |
|---|---|---|---|
| | | Zone A | Zone B |
| 1. | *Glacilaria saricornia* | 9, 186 eng /m $^2$ | 12,574 ind /m $^2$ |
| 2. | *Padina autralis* | 31, 1 eng /m $^2$ | 19,674 ind /m $^2$ |
| 3. | *Achanthopora spicifera* | 6, 22 eng /m $^2$ | 7.1 ind /m $^2$ |
| 4. | *Neomeris annulate* | 8, 325 eng /m $^2$ | 13,313 ind /m $^2$ |
| 5. | *Sargasum sp.* | 21, 339 eng /m $^2$ | 18,269 ind /m $^2$ |
| 6. | *Glacilaria blodgetti* | 2, 679 eng /m $^2$ | 2,588 ind /m $^2$ |
| 7. | *Chaetomorpha crassa* | 1, 339 eng /m $^2$ | 1.1 ind /m $^2$ |
| 8. | *Sargasum Natans* | 14, 066 eng /m $^2$ | 18,491 ind /m $^2$ |
| 9. | *Ulva lactuca* | 0, 669 eng /m $^2$ | 1,257 ind /m $^2$ |
| 10. | *Turbinatia ornate* | 1, 244 eng /m $^2$ | 2,884 ind /m $^2$ |
| 11. | *Glacilaria verrucosa* | 1, 626 eng /m $^2$ | 1.77 ind /m $^2$ |
| 12. | *Echeuma spinosum* | 2, 2 eng /m $^2$ | 0.961 ind /m $^2$ |
| Amount | | 99,913 ind /m $^2$ | 99,981 ind /m $^2$ |

From abundance data on can be seen there is a difference in mark abundance of grass sea from two different zones. In zone A (zone not submerged) value average abundance is 8,326 with 12 species of grass the sea has a mark abundance between 0.669-31.1 and/m 2. Type grass the sea has abundance individual highest is Padina autralis namely 31.1 ind /m 2and the abundance type Lowest is Ulva lactuca with mark abundance 0.669 ind /m 2. Analysis results in abundance in zone B (submerged zone) average abundance value of 12 types grass sea namely 8.331 ind /m 2. Abundance values in zone B range between 0.961-19.674 and 2. The type grass the sea has marked abundance highest is Padina autralisnamely 19.674 ind /m 2 and the value abundance type Lowest is Eucheuma Spinosum with value of 0.961 ind /m 2.

Compared with the results of study they (Armstrong *et al.,* 2000; Taylor & Steinberg, 2005; Tiwari & Troy, 2015), grass sea has long been known to support population-abundant bacteria so that startling that only A little considerate research on many protists heterotrophic on the surface grass sea. In A Study For some time a year, already done an investigation on several protists heterotrophic in tissues that are not broken and damaged

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

from several species of grass intertidal sea (Msuya, 2012).

Generally, amoeba and flagellates are not enough 20 cells cm-2 in tissue grass the sea is not damaged However found in more amount big (more than 20 cm-2) in damaged tissue. Ciliates are sized about 1 or 2 cells cm-2 in the grass the sea is not damaged and between 1 and 5 cm-2 in damaged tissue. Amount dinoflagellates heterotrophic and heterotrophic diatoms similar with several ciliates at the end season hot and seasonal fall when grass sea produces enhancement amount carbon organic dissolved (Hay, 1997). Assuming that protists on the ' true ' surface inhabit a thin layer of surface water on the grass sea, a comparison is done with the amount protists in the water open nearest (Millhr & Hay, 1996).

After the use factor proper conversion, fine amoeba nor flagellates more Lots is in the surface of the layer (per ml) compared to waters open (Eklöf et al., 2005). Specifically, amoeba the average surface amounts to about 1800 cells ml-1 but only reaches about 19 cells ml-1 in waters open (Bates, 2009). The result discussed the connection with various sources of available nutrients for protists heterotrophic in macroalgae. The height amount amoeba shows that they are micropredator main bacteria on the surface grass sea (Komatsu *et al.*, 2008).

## B. Index Diversity

The results of the diversity analysisgrass sea at 2The research zone show that there are differences in the type of acidity values at each station in 2 different zones (Table 4).

Table 4. Index Diversity Grass Sea

| No. | Zone | Index Value Diversity (H') | | | |
|---|---|---|---|---|---|
| | | Station 1 | Station 2 | Station 3 | Station 4 |
| 1. | Zone A | 1,088 | 1,045 | 2,083 | 1,728 |
| 2. | Zone B | 1,305 | 1,233 | 2,184 | 2,082 |

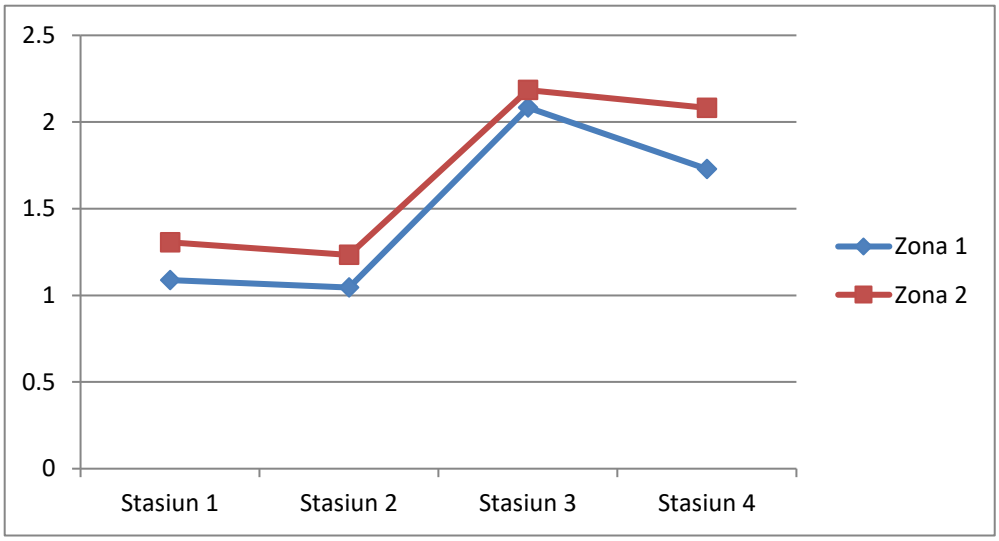


Figure 2. Graph Diversity Grass Sea

Based on the results of community structure analysis, namely diversity (H'), in the two research zones and the fourth station, there is a difference in mark index diversity. In zone A (zone not submerged moment low tide) value index diversity is obtained in the category currently until tall. The category currently indicated at stations one, two, and four with mark index diversity namely 1,088-1,728. Category high (stable) is shown at station 3 with a mark index diversity of 2,083.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

In zone B (submerged zone moment low tide) value index diversity is obtained in the category currently until tall. Station 1 and Station 2 have mark index diversity currently that is with mark indexes of 1.305 and 1.233. Category high (stable) is aimed at station 3 and station 4 with mark indexes 2.184 and 2.082. Difference mark index diversity in every station is influenced by the conditions of each region of the station, so several types of grasses sea Not grow in a few stations.

A study to type Nitellopsis obtusa, to measure the influence of Nitellopsis in the community macrophytes in New York waters. From the results survey on 4 lakes in the center New York City where community macrophytes caught impact negative from invasive macroalgae, and richness species more macrophytes low when Nitellopsis abundant. This pattern is consistent at 3 depths waters (shallow [>1 m], medium [1-2 m], and deep [>2 m]) (Lan *et al.*, 2012). Biomass macrophytes (total, including species original and non- original others, and only species original) in a way significantly morelow on the square with abundance. More nitellopsis big. Biomass Nitellopsis exceed combined biomass macrophytes in some lakes (Langmann, 2014). Nitellopsis more often found in waters compared to waters shallow in 2 lakes study (Sweet *et al.*, 2014). So Nitellopsis can impact negatively the community macrophytes and shows that taxon This can become dominant in the coastal zone invaded lake (Wulanningrum & Rachmad, 2012). Possibility of big species This is found in deeper waters, so prevent observation normal, so responsible personnel answer for monitoring programs must set customized protocols and methods to detect species invasive that spread and do not clear this (Ty *et al.*, 2012).

## C. Index Uniformity

From the results research conducted in Kelombok Village, then obtained results mark index uniformity grass sea at 4 stations and 2 different zones. Index data uniformity of grass sea can seen in table 5.

Table 5. Index Uniformity Grass Sea

| No. | Zone | Index Value Uniformity (e) | | | |
|---|---|---|---|---|---|
| | | Station 1 | Station 2 | Station 3 | Station 4 |
| 1. | Zone A | 0.438 | 0.42 | 0.838 | 0.695 |
| 2. | Zone B | 0.525 | 0.496 | 0.879 | 0.838 |

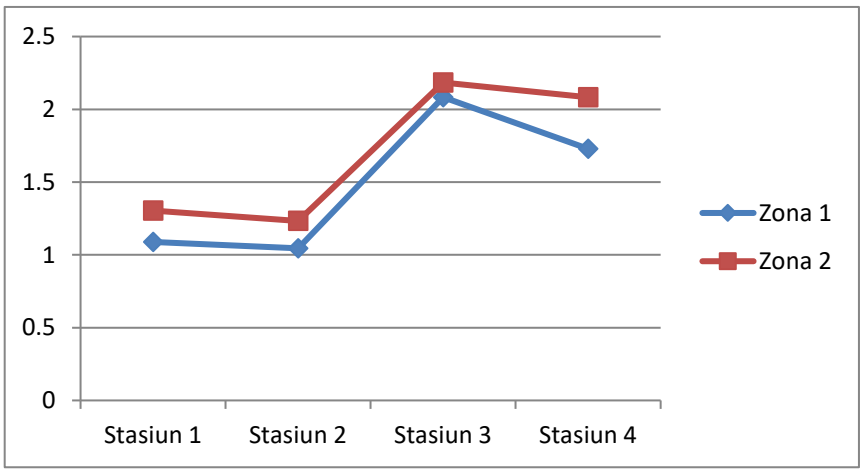


Figure 3. Graph Uniformity Grass sea

Based on results analysis that has been done about index uniformity grass sea in two different zones in Kelombok Village obtained zone A results (zone no submerged moment low tide) deep category currently until tall. The category currently shown in the value index uniformity station 1 and station 2 are 0.438 and 0.42. Categories tall are shown at station 3 and station 4, namely 0.838 and 0.695. Medium in zone B (submerged

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

zone moment low tide) is classified in the category medium and high. The category currently obtained from results analysis index uniformity station 1 and station 2 with values 0.525 and 0.496. Category tall shown at station 3 and station 4, namely 0.879 and 0.838 where e value > 0.6 then waters classified own level uniformity large population.

Especially in coastal areas, activities man the more increasing, the population is also increasing, temporary diversity biological sea Keep going decrease. Efforts To maintain and restore diversity in the biological sea become more nature-spatial, esp through the determination of area protection sea (MPA) (Lan *et al.,* 2012). KKP (Ministry of Marine and Fisheries) competes in a fight over the room with the utilization of others, and the emergency industry new, like generator energy renewable from the sea, will increase competition. For getting a room. The taker's decision needs a guide about the method of determining zoning sea for conserving diversity biological, mitigating conflict, and accommodating various utilities (Zlinszky *et al.,* 2014).

Here we use empirical data and tools to provide available plans for free to identify area priority for various ocean zones, which include objective conservation diversity life, two types of energy renewable, and three types of fishing (Kremen, 2005). We develop an approach for evaluating trade-offs between industries and we investigate the impact placement of a number of activity on-site energy renewable (Nakagami, 2006). We observe non-linear trade-offs between industries (Suppadit *et al*., 2012).

We also found out that various subsectors in industry the experience very different trade-off curves (Weber, 1977). Enter collocation produces subtraction significant costs for industry fisheries, including fisheries that do not are at the same location. Co-location also changes the optimal location of energy zones renewable with solution planning (NAKAGAMI, 2006). Our findings have implications wide to zoning marine and spatial planning sea. Specifically, they highlight the necessity to enter the subsector industry when assessing the trade-offs and they emphasize the importance of considering opportunity collocation from the beginning (D'Archino & Piazzi, 2021). Our research corroborates the necessity of zoning marine multi-industry and shows How matter This can done in framework planning conservation strategy.

### D. Index Domination

Based on the results of the analysis carried out regarding the Dominance index value of grass types sea in Kelombok Village so results were obtained mark index domination can see in table 6.

Table 6. Domination Grass Sea

| No | Species | Amount | Domination (c) |
|---|---|---|---|
| 1. | *Gracilaria saricornia* | 266 | 0. 0 12315 |
| 2. | *Padina autralis* | 591 | 0.060791 |
| 3. | *Achanthopora spicifera* | 161 | 0.004511 |
| 4. | *Neomeris annulate* | 267 | 0.012408 |
| 5. | *Sargassum sp.* | 470 | 0.038447 |
| 6. | *Gracilaria blodgetti* | 63 | 0.000691 |
| 7. | *Chaetomorpha crassa* | 29 | 0.000146 |
| 8. | *Sargassum natans* | 397 | 0.027431 |
| 9. | *Ulva lactuca* | 24 | 0.0001 5 |
| 10. | *Turbinatia ornate* | 52 | 0.000471 |

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

| | | | |
|---|---|---|---|
| 11. | *Glacilaria verrucosa* | 41 | 0.000293 |
| 12. | *Echeuma spinosum* | 36 | 0.000226 |

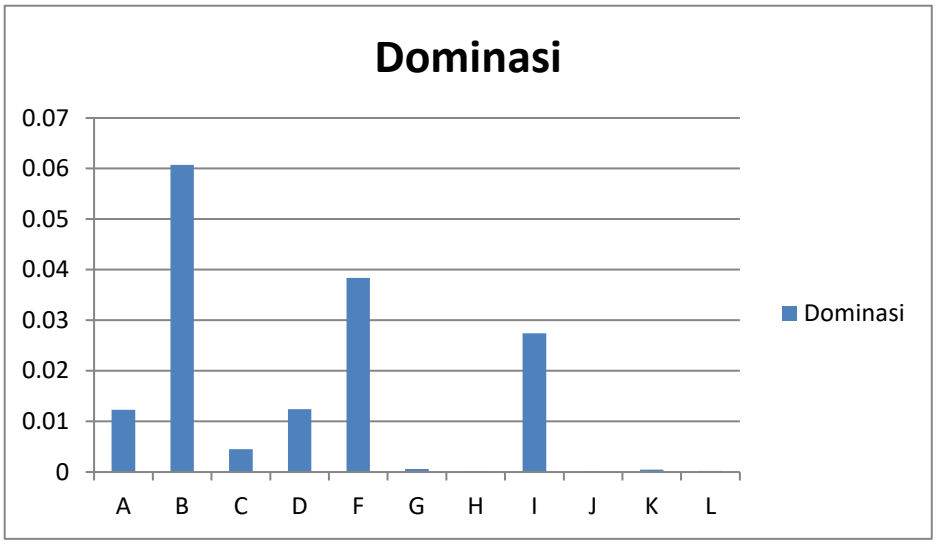


Figure 4. Graph Domination Grass Sea (A) G. *saricornia* (B) P. *autralis* (C) *Acanthopora spicifera* (D) N. *annulate* (E) *Sargassum sp.* (F) G. *blodgetti* (G) C. *crassa* (H) S. *Natans* (I) *Ulva lactuca* (J) *Turbinatia ornate* (K) G. *verrucosa* (L) *Echeuma spinosum*

Based on the results of the analysis carried out regarding the dominance index value of macroalgae types in Kelombok Village, the results were obtained mark index domination range between 0.00015-0.06079. This shows that the value of the grass dominance index sea in waters Kelombok is included in the stable category. This is by Ayhuan (2017) that if the Domination index value = 0 then it is in the stable category.

From research, (Lan *et al.*, 2012), Mycotoxin's size small (MW around 700), products chemistry poison is formed as metabolites secondary by some species easy mushrooms colonize plants and pollute plants with poison in the land or after harvest. According to (den Hartog, 1991) Ochratoxin and Aflatoxin is Mycotoxins are very important and therefore there is a study significant about various technique analysis and detection that can useful and practical (Zinck, 2015). Because of the variety of structures poison this, no Possible use One technique standard for analysis and/ or detection (Pool *et al.*, 2016).

According to Islam (Islam et al., 2014), the waters of Karang Tengah Beach, Nusakambangan Cilacap own various types, type substrate that is sand, coral, and mixed. Condition beach with Lots type substrate possible various species grass sea For grow. Information related diversity and dominance of species of grass sea producer hydrocolloids in the waters of Karangtengah Beach has Not yet Lots researched (Sweet *et al.*, 2014). The results of the research (Lan *et al.*, 2012) report as many six transect lines made in way upright straight with the coastline, and the distance between transects is 25 m. Every transect made three plots, each plot measuring 1x1 m based on the substrate (coral, sand, and mixture). The main parameters observed are the amount of biomass and the quantity of species (D'Archino & Piazzi, 2021). Amount species grass sea hydrocolloids found as many as 10 species grass sea with details of 5 species producer alginate, 3 species agar producer, and 2 species producer carrageenan. Index value diversity in Waters Beach Karangtengah is between 0.6-and 2.0 classified diversity currently. Index value dominance in the waters of Karangtengah Beach between 0.2-0.6 classified dominance low (Lan *et al.*, 2012).

## E. Water Quality

Water quality is one of the usual indicators used for knowing conditions and eligibility something waters that become living habitats grass sea. Water quality in waters Kelombok Village is classified as normal and suitable for life in the grass sea. For more, he explained the results of the measurement of water quality in waters Kelombok Village can seen in Table 5.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

Table 7. Water Quality in Kelombok Village

| No | Parameter | Location | | | |
|---|---|---|---|---|---|
| | | Sta.1 | Sta.2 | Sta.3 | Sta.4 |
| 1. | Brightness (m) | 1 | 1 | 1 | 1 |
| 2. | Temperature (C $^{o}$) | 29 | 30.1 | 29.5 | 29.42 |
| 3. | Salinity (‰) | 29.5 | 29.5 | 30 | 30 |
| 4. | Speed current (m/s) | 0.071 | 0.071 | 0.071 | 0.071 |
| 5. | Dissolved Oxygen (ppm) | 6,8 | 6.78 | 7.12 | 7.23 |
| 6. | Depth (m) | 0.83-1.7 | 0.85-1 | 0.75-1 | 0.78-1.04 |
| 7. | pH | 7.8 | 7.85 | 8 | 8 |
| 8. | Nitrate (mg/L) | 0.01 | 0.01 | 0.01 | 0.01 |
| 9. | Phosphate (mg/L) | 0.073 | 0.073 | 0.073 | 0.073 |

## CONCLUSION

Based on research that has been carried out in water Kelombok Village, District Phallus Regency Phallus found 1 2 types of seaweed that live in waters Kelombok Village consists of 3 types of green algae (Chlorophyta), 4 types of brown algae (Phaeophyta) and 5 types of red algae (Rhodophyta). The value of abundance is divided into two from zones A and B, The value of zone A abundance (no submerged) ranges between 0.669-31.1 ind /m 2, in zone B (submerged zone) 0.961-19.674 ind /m 2. Index value diversity in category currently until high (stable). Category currently ranges from 1,088-1,728. Category high (stable) ranges from 2,082 to 2,184. Index value uniformity in category currently until tall. Category currently ranges between 0.42-0.525, and Category tall ranges from 0.695 to 0.879. Index value domination ranges between 0.00015-0.06079 and is declared normal. Water quality in waters Kelombok Village is classified as normal and suitable for life in the grass sea.

## BIBLIOGRAPHY


1. Abe, S., Nakashizuka, T., Tanaka, H., Addo-Fordjour, P., Anning, AK, Larbi, JA, Akyeampong, S., Atakora, EA, Agyei, PS, Rahmad, ZB, Aide, TM , Zimmerman, J.K., Herrera, L., Rosario, M., Serrano, M., Alder, D., Synnott, T.J., Alfonso-Corrado, C., Clark-tapia (1996). Early species selection for tropical reforestation: a consideration of stability. Forest Ecology and Management , 81 , 1–7.
2. Akmal, Jubhar, D .( 2017) Morphology, chlorophyll a content, growth, production, & carrageenan content of Kappaphycus alvarezii seaweed cultivated at different depths, Indonesian Seaweed Journal, 2(2): 39–50.
3. Armstrong, E., Rogerson, A., & Leftley, J. W. (2000). The abundance of heterotrophic protists associated with intertidal seaweeds. Estuarine, Coastal and Shelf Science .
4. Arthaud, F., Vallod, D., Robin, J., & Bornette, G. (2012). Eutrophication and drought disturbance shape functional diversity and life-history traits of aquatic plants in shallow lakes. Aquatic Sciences , 74 (3), 471–481.
5. Bates, C.R. (2009). Host taxonomic relatedness and functional-group affiliation as predictors of seaweed-invertebrate epifaunal associations. Marine Ecology Progress Series .
6. D'Archino, R., & Piazzi, L. (2021). Macroalgal assemblages as indicators of the ecological status of marine coastal systems: A review. Ecological Indicators , 129 .
7. De Paula, A.F., Figueiredo, MADO, & Creed, J.C. (2003). Structure of the macroalgal community associated with the seagrass Halodule wrightii Ascherson in the Abrolhos Marine National Park, Brazil. Botanica Marina , 46 (5), 413–424.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

8. den Hartog, C. (1991). Distribution of {Plasmodiophora} bicaudata , a parasitic fungus on small Zostera species. Dis. Aquat. Org. , 6 (3), 227–229.
9. Edwards, C.B., Eynaud, Y., Williams, G.J., Pedersen, N.E., Zgliczynski, B.J., Gleason, ACR, Smith, J.E., & Sandin, S.A. (2017). Large-area imaging reveals biologically driven non-random spatial patterns of corals at a remote reef. Coral Reefs , 36 (4), 1291–1305.
10. Eklöf, J.S., De La Torre Castro, M., Adelsköld, L., Jiddawi, N.S., & Kautsky, N. (2005). Differences in macrofaunal and seagrass assemblages in seagrass beds with and without seaweed farms. Estuarine, Coastal and Shelf Science , 63 (3), 385–396.
11. Freeman, A.S., Short, F.T., Isnain, I., Razak, F.A., & Coles, R.G. (2008). Seagrass on the edge: Land-use practices threaten coastal seagrass communities in Sabah, Malaysia. Biological Conservation , 141 (12), 2993–3005.
12. González-Gurriarán, E., Fernández, L., Freire, J., & Muiño, R. (1998). Journal of Experimental Marine Biology and Ecology, 229 (1998) 1–18. Journal of Experimental Marine Biology and Ecology , 229 (1), 1–18.
13. Hay, M. E. (1997). The ecology and evolution of seaweed-herbivore interactions on coral reefs. Coral Reefs .
14. Islam, S., Rahman, M., & Chakma, S. (2014). Plant diversity and forest structure of the three protected areas (Wildlife Sanctuaries) of Bangladesh sundarbans: Current status and management strategies. In Mangrove Ecosystems of Asia: Status, Challenges and Management Strategies pp: 127–152.
15. Komatsu, T., Matsunaga, D., Mikami, A., Sagawa, T., Boisnier, E., Tatsukawa, K., Aoki, M., Ajisaka, T., Uwai, S., Tanaka, K., Ishida, K., Tanoue, H., & Sugimoto, T. (2008). Abundance of drifting seaweeds in the eastern East China Sea. Journal of Applied Phycology .
16. Kremen, C. (2005). Managing ecosystem services: What do we need to know about their ecology? In Ecology Letters Vol. 8(5) : 468–479).
17. Lan, T.D., Huong, DTT, & Trang, CTT (2012). Assessment of Natural Resources Use for Sustainable Development - DPSIR Framework for Case Studies in Hai Phong and Nha Trang, Vietnam. Proceedings of the 12th International Coral Reef Symposium , 7 (July), 9–13.
18. Langmann, B. (2014). The Impact of Vegetation and Peat Fire Emissions in Indonesia on Air Pollution and Global Climate. Asian Journal of Water, Environment and Pollution , 11 (1), 3–11. Earth.29.1.17; Duncan, BN, Bey, I., Chin, M., Mickley, LJ, Fairlie, TD, Martin, RV, Matsueda, H., Indonesian wild science of 1997: Impact on tropospheric chemistry (2003)
19. Geophys J., Res., 108. , (2003) Digital Soil Map of the World and Derived Soil Properties, , FAO/UNESCO; Field, RD, Van Der Werf, GR, Shen, SSP, Human amplification of drought-induced biomass burning in Indonesia (2009) Nature Geoscience, 2.
20. Lapointe, B. E., Littler, M. M., & Littler, D. S. (1987). A comparison of nutrient-limited productivity in macroalgae from a Caribbean barrier reef and from a mangrove ecosystem. Aquatic Botany .
21. Lee, G.F., Jones, P.E., & Jones, R.A. (1991). Effects of Eutrophication on Fisheries. Reviews in Aquatic Sciences , 5(3) : 287–305.
22. Mallin, M. A., Burkholder, J. M., Cahoon, L. B., & Posey, M. H. (2000). North and South Carolina coasts. Seas at the Millennium - an Environmental Evaluation - Volume 1 .
23. Marescaux, J., Pigneur, L., & Doninck, K. Van. (2010). New records of Asian clams Corbicula spp. in French rivers. Nautilus , 5(2) : 2–5.
24. McCook, L. J. (1999). Macroalgae, nutrients and phase shifts on coral reefs: Scientific issues and management consequences for the Great Barrier Reef. In Coral Reefs 18(4) : 357–367.
25. Millhr, M. W., & Hay, M. E. (1996). Coral-seaweed-grazer-nutrient interactions on temperate reefs. Ecological Monographs .
26. Msuya, FE kyevalanga. (2012). A Study of Working Conditions in the Zanzibar Seaweed Farming Industry. In Journal of Applied Phycology, Vol. 26, Issue 2.
27. NAKAGAMI, H. (2006). Energy Conservation Measures for the Residential Sector. Journal of the Society of Mechanical Engineers .
28. Pool, E. K., Shahidi, F., Mortazavi, S. A., & Mohebbi, M. (2016). Study of different levels of micro-algae Spirulina platensis on the microstructure and psychochemical and sensory characteristics of kiwi pastille. Iranian Food Science & Technology Research Journal .
29. Priono, B. (2016). Seaweed Cultivation in Efforts to Increase Fisheries Industrialization. Aquaculture

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue VII July 2024

Media , 8 (1) : 1.
30. Rasher, D. B., Hoey, A. S., & Hay, M. E. (2017). Cascading predator effects in a Fijian coral reef ecosystem. Scientific Reports , 7 (1).
31. Sarita, IDAADS, Subrata, IM, Sumaryani, NP, & Rai, IGA (2021). Identify the types of seaweed found in the natural ecosystem of Nusa Penida Waters. Journal of Mathematics and Science Education , 10 (1) : 141–154.
32. Sodiq, AQ, & Arisandi, A. (2020). Identification and Abundance of Macroalgae on the South Coast of Gunungkidul. Juvenil:Journal of Marine and Fisheries Science , 1 (3) : 325–330.
33. Sunarernanda, YP, Ruswahyuni, & Suryanti. (2014). The relationship between seaweed density and epifauna abundance on different substrates at Teluk Awur Beach, Jepara. Management of Aquatic Resources Journal , 3 (3) : 43–51.
34. Suppadit, T., Kitikoon, V., Phubphol, A., & Neumnoi, P. (2012). Effect of Quail Litter Biochar on Productivity of Four New Physical Nut Varieties Planted in Cadmium-Contaminated Soil. Chilean Journal of Agricultural Research , 72 : 125–132.
35. Sweet, MJ, Croquer, A., Bythell, JC, Spalding, MD, Burke, L., Wood, S.A., Ashpole, J., Hutchison, J., zu Ermgassen, P., Whitfield, A.K., van Tussenbroek, B.I. , van Katwijk, MM, Bouma, TJ, van der Heide, T., Govers, LL, Leuven, RSEW, Scheibling, RE, Patriquin, DG, Filbee-Dexter, K.,Wallace, CC (2014). New insights into the dynamics between reef corals and their associated dinoflagellate endosymbionts from population genetic studies. Marine Ecology Progress Series , 2(1) : 1–8.
36. Taylor, R.B., & Steinberg, P.D. (2005). Host use by Australasian seaweed mesograzers in relation to feeding preferences of larger grazers. Ecology.
37. Ty, T. Van, Sunada, K., Ichikawa, Y., Oishi, S.S., Tran, V.T., Sunada, K., Ichikawa, Y., & Oishi, S.S. (2012). Scenario-based impact assessment of land use/cover and climate changes on water resources and demand: a case study in the Srepok Basin, Vietnam - Cambodia. Water Resource Management , 26(5) : 1387–1407.
38. Wu, H., Huo, Y., Hu, M., Wei, Z., & He, P. (2015). Eutrophication assessment and bioremediation strategy using seaweeds co-cultured with aquatic animals in an enclosed bay in China. Marine Pollution Bulletin .
39. Wulanningrum, R., & Rachmad, A. (2012). Seaweed Recognition Using Based Euclidean Distance. National Seminar on Information Technology Applications (SNATI) , 2012 (Snati), 15–16.
40. Zinck, J. A. (2015). The Geomorphic Landscape: Classification o Geoforms. Geopedology: An Integration of Geomorphology and Pedology for Soil and Landscape Studies, 1–556.
41. Zlinszky, A., Zheng, T., You, Clubbe, C., Baalbaki, R., Ghalayini, A., Talhouk, S. ., Young, E.H., Yorio, P., QUINTANA, F., DELL'ARCIPRETE, P., Clay, P.M. (2014). Access to Marine Bioresources: Hitching the Conservation Cart to the Bioprospecting Horse. Biological Conservation, 19 (1)
42. Zydlewski, GB, Haro, A., Mccormick, SD, Stich, DS, Mccormick, SD, Zuur, AF, Ieno, EN, Walker, NJ, Saveliev, A. a., Smith, GWM, Ebooks Corporation., Zubair, SN, Peake, SJ, Hare, JF, Anderson, WG, Zheng, K., Wang, W., Hung, SSOSSOO, Deng, DFD-F., Petry, P. (2011). Hydrogeomorphology-Ecology Interactions in River Systems. Transactions of the American Fisheries Society , 1 (1) : 1085–1095.