Community structure of seagrass

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Community Structure Of Seagrass In Ketawai Island, Bangka Belitung Islands Province, Indonesia

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***Abstract*—The seagrass ecosystem of Ketawai Island has the potential as a shelter, feeding, spawning ground from various aquatic organisms and it has an important role for the coastal and marine environment. The utilization of coastal and Ketawai island as a tourist area becomes a threat to the growth of seagrass community. This study aimed to analyze the community structure of seagrass, the coverage percentage, the density and the seagrass frequency located in Ketawai Island. The results showed that there were 8 (eight) species found in sampling site. It consists of *Cymodocea serrulata, Enhalus acoroides, Syringodium isoetifolium, Cymodocea rotundata, Halodule uninervis, Thalassia hemprichii, Halophila ovalis, Halodule pinifolia*. *Cymodocea serrulata* found in the highest density, highest attendance, highest frequency and highest percent of overage in all sampling site. Further study should be done to analyze the influence of physicochemical water parameters related to seagrass community**

***Keywords*— Ketawai Island, Seagrass, Community Structure, Tin Minning, Diversity**

I. INTRODUCTION

Bangka Belitung Islands Province has many small islands. One of them is Ketawai Island that located in Central Bangka Regency. Ketawai Island has an area of 30 hectares. This island is one of the top tourist destinations in Bangka Belitung [2, 3]. Ketawai island also provided seagrass ecosystems spread along the coast [4].

Seagrass is one of the ecosystems that plays an important role in life in the sea [5]. The seagrass beds are spawning and nursery ground for some species. This seagrass bed may also trap sediment, when the leaves approaches the surface, this floating leaves break the force of the waves, and forming a calm habitat over the bed [1]. Small fishes sometimes using this leaves to avoid the predator.

The use of coastal and Ketawai island as a tourist area becomes a threat to the seagrass community. For that reason, basic data was needed which refers to seagrass management. However, there was lack of the information and basic data on seagrass management in the Ketawai Island. Based on these problems, this research was conducted to determine the Seagrass Community Structure in Ketawai Island which included species diversity, density, coverage, and seagrass ecological index analysis.

II. MATERIALS AND METHODS

A. Study Area

The research was conducted in August 2017, at Ketawai Island, Bangka Belitung Islands Province, Indonesia (Fig 1). The sampling stations were selected based on the purposive sampling method.

Three stations (St.1, St.2, St.3) in Ketawai island were chosen for sampling in the presence of seagrass, related to anthropogenic activities in this site.

B. Sampling Techniques

The tools used in this study consisted of basic diving equipment (mask, snorkel and fins), transect frame squared with size 0.5 m x 0.5 m, small scope, sample bag, paper label, GPS (Global Positioning System), underwater camera, plastic tray, stationery, identification book of seagrass. The materials used in this study were seagrass samples taken from Ketawai Islands. The method used in this study was quadratic transect..

Observations of seagrasses were carried out visually on each plot in the transect [6]. Seagrass data taken on each plot included the number of stands, frequency, and percent closure of each type. One way to identify species of seagrass is to recognize the morphological forms of leaves, stems, ryzomes, roots, flowers and fruit.

C. Data Analysis

The data analyzed in this study included seagrass species composition, absolute density, relative density, absolute frequency, relative frequency, absolute closure, relative coverage, important value index (IVI).

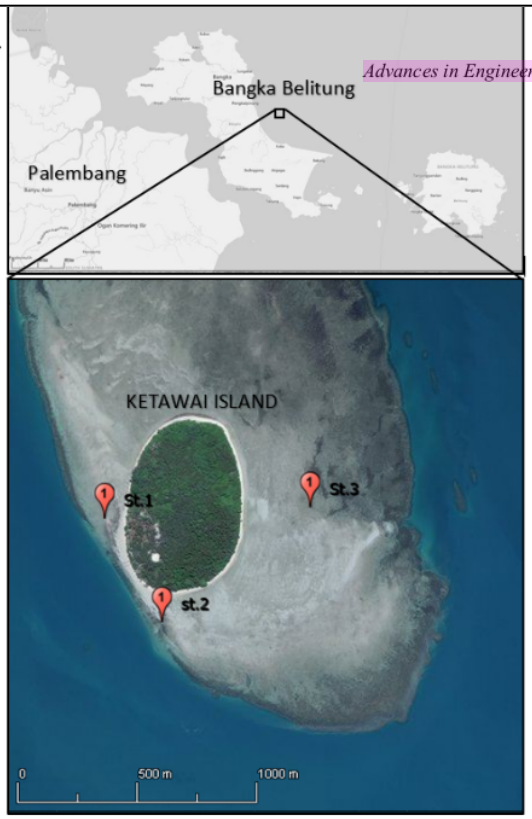

Fig. 1. Map showing the position of Ketawai Island, Bangka Belitung Province, Indonesia and the sampling stations. *(St.1 at S 2,266053° E 106,324451°; St.2 at S 2,270009° E 106,326637°; and St.3 at S 2,265747° E 106,332173°)*

III. RESULT

Seagrass beds on Ketawai Island are overgrown by 8 species of seagrass which consists of 2 families (Cymodoceaceae and Hydrocharitaceae). The Cymodoceaceae family consists of five species, *Cymodocea rotundata (Cr) Cymodocea serrulata (Cs) Syringodium isoetifolium (Si) Halodule uninervis (Hu) Halodule pinifolia (Hp).* Hydrocharitaceae family consists of species *Enhalus acoroides (Ea), Thalassia hemprichii (Th) Halophila ovalis (Ho).*

Seagrasses that grow in the Pulau Ketawai adjacent waters are heterogeneous vegetation, ranging from 2 species to 5 species in each transect. Seagrass growth zone starts from the tidal area to the coral reef area. Formation towards the sea, type Enhalus acoroides, Cymodocea rotundata and Halodule uninervis are the first species found during observation.

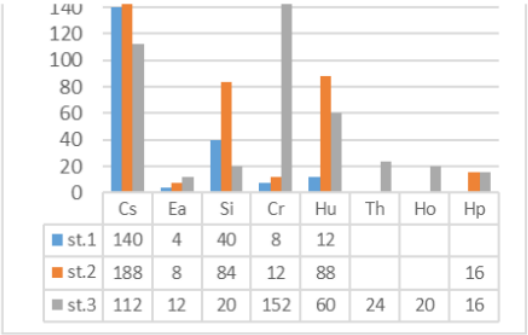

Fig. 2. Seagrass density (shoot/m^2) in Ketawai Island

A. *Seagrass Density*

Seagrass density is influenced by the number of an individual type of seagrass in a certain area. Based on observations, the seagrass density of Ketawai Island can be seen in Figure 2.

Based on Fig. 2, it can be seen that in Ketawai Island found 8 seagrass species. The highest density of *Cymodocea serrulata* with a value of 140 individual/m^2 was found at the first station and the lowest density of *Enhalus acoroides* was about 4 individual/m2. *Cymodocea serrulata* was found in the highest density at the second station 2 with 188 individual/m^2, while the lowest density was *Enhalus acoroides* was about 8 individual/m^2. The third station showed that the highest density was *Cymodocea rotundata*, 112 individual/m^2 and the lowest was *Enhalus acoroides* 12 individual/m^2.

B. *The Coverage Of Seagrass*

The coverage showed the level of space coverage by seagrass communities. The Information of seagrass coverage was important to know the condition of seagrass community. The coverage of seagrass was influenced by the density of the species and the size of the seagrass morphology. The percentage of seagrass coverage for each type of seagrass found at each station in Ketawai Island can be seen in Fig. 3

C. *Seagrass Frequency*

The frequency described the chances of finding the seagrass species in the plots of sample created and showed the distribution of seagrass species found at Ketawai Island. Seagrass frequency found in Ketawai Island can be seen in Fig. 4

D. *The Important Value Index (IVI)*

This index (IVI) described the seagrass species relative to other species in the research area. The IVI value was highly dependent on the values of relative density, relative frequency and relative coverage of each species of seagrass. The higher value of the component showed the larger IVI value and the more important the role of the type in the

community. Based on the IVI value, it can be seen the role of seagrass species in the community (large, medium or low role).

The results (Fig. 5) showed that the highest important value index (IVI) found at the first station was *Cymodocea serrulata* 1.66 and the lowest was *Enhalus acoroides* 0.19, while for the second station found the highest IVI was *Cymodocea serrulata* around 1.51 and the lowest was *Halodule pinifolia* 0.10. The highest value of IVI found in the last station was *Cymodocea serrulata* 0.94 and the lowest was *Halodule pinifolia* 0.08

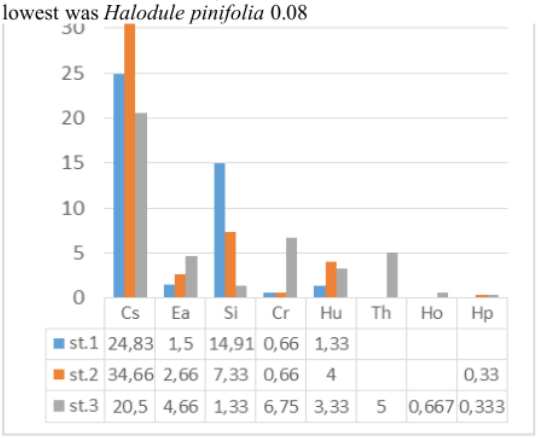

Fig. 3. The seagrass coverage (%) in Ketawai Island

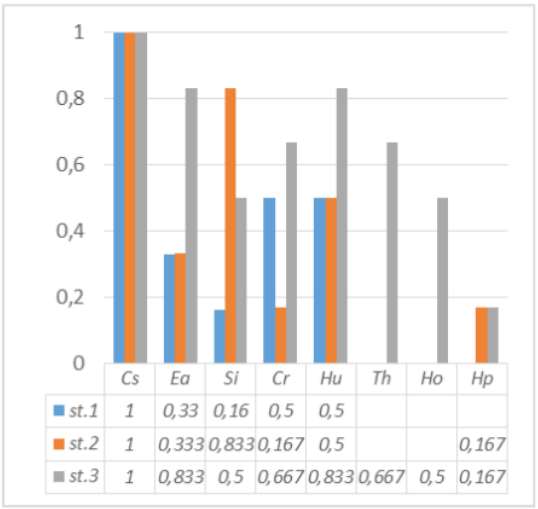

Fig. 4. The frequency of seagrass

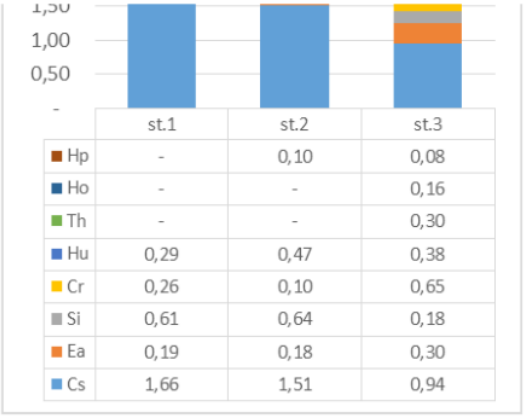

Fig. 5. The Important Value Index (IVI) of seagrass

IV. DISCUSSIONS

The number of seagrasses on the Ketawai island (Bangka Tengah district) is the same number of seagrass found on the Lepar Island (Bangka Selatan district), which is 8 species. Based on IVI, the Halodule uninervis type plays an important role in the Lepar Island, while in the research location (Ketawai Island) the role of *Cymodocea serrulata* is greater in the community, compared to other types of seagrasses.

Knowledge of seagrass in a waters can be used to find out the description of the condition of the island. The presence of Cymodocea together with the types of Halodule, Halophila and Thallasia is a feed from Dugongs on Ketawai Island [7; 8]. Green turtles also eat Cymodocea seagrass [9; 10; 8], this is what makes Dugongs and Green Turtles often seen near Ketawai Island.

Reference [1] explained that the type of Cymodocea is a type of seagrass that is only found in tropical regions. Cymodocea is more resistant / persistent compared to Halophile or Halodule types. in the study area also found *Halophila ovalis*, a type of seagrass commonly found in muddy areas, this is in accordance with the condition of station 3 which has a muddy sand bottom.

V. CONCLUSIONS

The present study showed that there were 8 (eight) species found at Ketawai island, *Cymodocea serrulata, Enhalus acoroides, Syringodium isoetifolium, Cymodocea rotundata, Halodule uninervis, Thalassia hemprichii, Halophila ovalis, Halodule pinifolia. Cymodocea serrulata* was found in the highest density, highest attendance, highest frequency and highest percent of seagrass coverage in the research area.

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