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STUDY OF WATER QUALITY ON MANGROVE ECOSYSTEMS AT BOJONG SALAWE PANGANDARAN

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ABSTRACT

Bojong Salawe is located in Karangjaladri Village, is one of the villages located in Parigi District, Pangandaran Regency, West Java Province where Pangandaran Regency itself is a relatively young district because it is the result of the expansion of Ciamis Regency, West Java. Bojong Salawe has a mangrove conservation area located around the coast and estuary. The method used in this study is a survey method where measurements are made directly in the field (in-situ). The mangrove ecosystem in bojong salawe grows along the coastline or on the banks of the river which is influenced by the tides of a combination of river water and sea water. In general, the condition of the waters of Bojong Salawe is still fairly good, not exceeding the water quality standards, with a pH value of 7.35 – 7.9. This value indicates moderately alkaline water. Based on MENLH Decree No. 51 of 2004, this value is still within the sea water quality standard for biota, which is between pH 7 – 8.5. salinity values in the waters of the estuary Bojong Salawe ranged from 33 - 35 ppt with an average of 33.6 ppt. This value corresponds to the salinity value of seawater, which is between 33 – 37 ppt. According to the Minister of Environment Decree No. 51 of 2004, this salinity value is suitable for mangrove, seagrass and coral reef ecosystems. The water temperature is in the range of 28°C to 32°C. The dissolved oxygen value is in the DO range of 6-8 mg/L, this still shows that the water conditions are in the normal category in accordance with quality standards.

INTRODUCTION

Bojong Salawe is located in Karangjaladri Village, is one of the villages located in Parigi District, Pangandaran Regency, West Java Province where Pangandaran Regency itself is a relatively young district because it is the result of the expansion of Ciamis Regency, West Java. One of the attractions in this village is Bojong Salawe Beach which is located about 20 km and is located west of Pangandaran where the beach which has a latitude of -7.7150340 and a longitude of 108.5010930 has a mangrove conservation area located around the coast and the estuary of Bojong Salawe. , Parigi District or more precisely around the bridge before heading to the point of Bojong Salawe Beach. The mangrove ecosystem, which is located on the coast of Bojong Salawe Beach, covers an area of 237.59 ha [3]. In addition to having a mangrove ecosystem on its coast, Bojong Salawe Beach also has more complex oceanographic conditions located along the South Coast of Java, this is due to Bojong Salawe Beach which is directly adjacent to the Indian Ocean so that both currents and waves are very large [7]. Regarding the condition of the area, the sea water is quite clear but there is a lot of

floating garbage, the waves are quite high, the weather is sunny during the day, there are many mangrove areas that grow around the waters of Bojong Salawe. This mangrove area was damaged by the tsunami that occurred in Pangandaran in 2006, but has since recovered.

METHODS

The method used is a survey method and for mangrove data collection using the Sample Plot method or commonly referred to as the Line Transect Plot. This method is a method of sampling the population in an ecosystem by using a sampling approach that is on a line drawn through the ecosystem area. Line Transect Plot is a method of taking population samples from an ecosystem through a sample plot approach. Where, at each location a straight line transect was made using the help of GP.[8]. This measurement method is one of the easiest measurement methods to do and has a high level of accuracy and precision [9]. Seawater quality data were taken from 3 stations scattered along the coast of Bojong Salawe. The travel time required from the starting point to the research location ranges from 10 to 15 minutes. Water quality data taken in the form of acidity (pH) data using a pH meter, DO (Dissolve oxygen) using a DO meter, salinity using a refractometer, temperature using a thermometer at each research station. In addition to water quality parameter data, wind speed and direction data were taken using an anemometer.

RESULTS AND DISCUSSION

Water quality of pH

An estuary is a mixture of two bodies of water, freshwater and seawater, and is influenced by the physical properties of the water such as seasons, tides, tides, temperature, and salinity.[10] Where, this estuary is the meeting point of river water with sea water. The impact of anthropogenic activities on the physical and chemical constituents of rivers has an impact on aquatic species. Muara Bojong Salawe is an environment that has a lot of fish, but there has never been any research on varieties and fish in that location. Muara Bojong Salawe is located in Cijulang District, Pangandaran, West Java. The estuary of Bojong Salawe is the meeting place of water from the Cijulang River, Lenggong River, and the open sea. Therefore, the estuary ecosystem in the Bojong Salawe estuary is one of the breeding grounds for brackish living creatures. The elements of the organism are composed of freshwater organisms, salt waters which then form the typical organisms of the estuary.

From the measurement results, it was found that the average pH of all stations in Muara Bojong Salawe was 7.77, with a range of 7.35 – 7.9. This value indicates moderately alkaline water. Based on MENLH Decree No. 51 of 2004, this value is still within the seawater quality standard for biota, which is between pH 7 – 8.5. In general, the waters are more alkaline than the results of measurements taken at Muara Cijulang, one of the rivers that empties into Muara Bojong Salawe. The pH of the Cijulang estuary is 5.96 – 8.00 Variations and changes in pH in the estuary can be caused by various things, such as bacterial activity, water turbulence, chemicals from river runoff, sewage overflow, and human activities, even acid rain.[11]. In addition, the sampling time also affects the pH because it is related to the photosynthesis process. Photosynthesis that occurs in water will reduce the amount of CO2 in the water so that the pH can increase significantly. The pH value of the estuary itself usually ranges from 7.0 – 7.5 in the fresher areas and 8.0 – 8.6 in the saltier areas. The higher pH values at high salinity are due to the presence of natural buffers of water-soluble carbonates and bicarbonates.

Salinity

salinity values show values ranging from 14 - 26 psu with an average of 21.66 psu. This value corresponds to the salinity value of seawater, which is between 33 – 37 psu. According to the Minister of Environment Decree No. 51 of 2004, this salinity value is suitable for mangrove, seagrass and coral reef ecosystems. Indonesia is located in a location where the water depth is relatively shallow so that it allows sunlight to enter and affects evaporation, as well as rainfall which affects temperature and salinity. Salinity at a depth

of 1.5 meters has an unpredictable value compared to other stations. This is due to material from the surface of the water colliding with material from the seabed. The distribution of salinity in the sea is influenced by various factors, such as patterns of water circulation, evaporation, rainfall, and river flow [12], as well as tides and winds. Evaporation determines salinity, the higher the evaporation, the higher the salinity. Vice versa, the lower the evaporation, the lower the salinity. Precipitation also affects salinity. Thus, the more rain, the lower the salinity. On the other hand, the less rain, the greater the salinity. Salinity of the estuary itself can range from 0.5 psu to 30 psu and is divided into 3 types, namely oligohaline (0.5-5.0 psu), mesohaline (5.0-18.0 psu), or polyhaline (18.0-30.0 psu). This salinity value belongs to polyhaline (18 – 30 ppt).

Temperature

Water temperature certainly cannot be ruled out in describing the quality of a water. Not only affects the metabolism, growth, and development of aquatic biota in it, but also changes that can have an impact on the material cycle in it. Changes in surface temperature have an effect on physical, chemical and biological processes in these waters [13]. The water temperature at this observation location concludes that the results collected from all stations, namely the lowest temperature is around 27.5°C and the highest is 35.2°C. The distance between the lowest and highest temperatures does show a very wide limit, but if you look more deeply, most of the temperature data is only in the range of 28°C to 32°C. In general, the temperature between 28 - 31°C is the surface temperature in the waters [12]. From the existing data, the conditions are quite normal for a tropical waters. It doesn't really matter if there are several stations that exceed this range because if it relates to the temperature conditions favored by fish, the optimal temperature range for fish life in tropical waters is between 28° - 32°C. Temperature variations in each station are influenced by many causes and conditions. Temperatures in water bodies are influenced by season, latitude, time of day, air circulation, cloud cover and water flow and depth [14]. The intensity of sunlight has a direct impact on the existing temperature fluctuations. Light that enters the water will be absorbed and undergo changes to produce heat energy.

Disolved oxygen

Dissolved oxygen shows the dissolved oxygen content in the water. In addition to being supplied from the photosynthetic results of autotrophic organisms that live there, oxygen from the air near the water's surface is able to directly dissolve and diffuse into the water. The data presented in this observation show results that have many differences. Many data show a DO range of 6 – 8 mg/L, but on the other hand, not a few also touch very high values >20 mg/L. The dissolved oxygen content in ideal waters is in the range of 3-7 mg/L. However, the overall data illustrates that DO conditions in the estuary are not less than conformity with the DO quality standards that have been set, namely DO > 5 mg/L based on the Minister of Environment Decree No. 51 of 2004 for marine life. The very high DO levels at some station points could be caused by the abundance of oxygen-producing organisms, such as seagrass beds. Turbulence, turbidity level, atmospheric factors and conditions, mass movement of water, and input of waste are some of the things that can provide differences in DO levels in the waters. DO levels are also closely related to temperature increases because they can cause water stratification or coating which can affect water agitation and is needed in order to spread oxygen [14].

Mangrove Ecosystem

Bojong Salawe has a mangrove conservation area. The mangrove conservation area is located around the coast of Bojong Salawe Beach, Parigi District or precisely around the bridge before heading to the point of Bojong Salawe Beach. The river under the bridge is part of the Cialit river which flows from the north while the Cikiray River flows from the west, but both empties into Bojong Salawe Beach. The existence of the mangrove forest is certainly very influential on the surrounding ecosystem, including being able to prevent sea water intrusion, coastal abrasion and erosion, natural prevention and filtering, and to stabilize coastal areas [1]

The mangrove ecosystem, which is located on the coast of Bojong Salawe Beach, covers an area of 237.59 ha [3]. In addition to

having a mangrove ecosystem on its coast, Bojong Salawe Beach also has more complex oceanographic conditions located along the South Coast of Java, this is due to Bojong Salawe Beach which is directly adjacent to the Indian Ocean so that both currents and waves are very large [7]. The types of mangroves found were *Rhizopora Apiculata, Rhizopora Mucronata, Rhizopora Stylosa, Rhizopora mangle*.

In addition, there are about ten types of plants in the mangrove forest area of Bojong Salawe including nipah, fires, coconuts, pidada, mangroves, sea hibiscus, jeruju, ketapang, sea pandanus, and horse treads. Bojong Salawe mangrove ecosystem type consists of natural forest which is dominated by mangroves *(Rhizophora*) and fires (*Avicenna*,) while the fauna found are blodog (mudskipper) and shrimp. [2]. The existence of mangroves also plays an important role for fishermen around the coast of Pangandaran Regency because mangroves can be a habitat for mangrove crabs and shrimp that have economic value [3].

Conclusion

The mangrove ecosystem in bojong salawe grows along the coastline or on the banks of the river which is influenced by the tides of a combination of river water and sea water. In general, the condition of the waters of Bojong Salawe is still fairly good, not exceeding the water quality standards, with a pH value of 7.35 – 7.9. This value indicates moderately alkaline water. Based on MENLH Decree No. 51 of 2004, this value is still within the seawater quality standard for biota, which is between pH 7 – 8.5. salinity values in the waters of the estuary Bojong Salawe ranged from 33 - 35 ppt with an average of 33.6 ppt. This value corresponds to the salinity value of seawater, which is between 33 – 37 ppt. According to the Minister of Environment Decree No. 51 of 2004, this salinity value is suitable for mangrove, seagrass and coral reef ecosystems. The water temperature is in the range of 28°C to 32°C. The dissolved oxygen value is in the DO range of 6-8 mg/L, this still shows that the water conditions are in the normal category in accordance with quality standards.

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