MEASUREMENT OF PHYSICAL PARAMETERS OF WATERS IN ESTIMATE BOJONG SALAWE PANGANDARAN

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ABSTRACT

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. The quality of water in a waters or estuary is an important thing that must be considered to determine the feasibility of living for marine organisms. Therefore, it is necessary to determine the status of water quality to monitor pollution based on the physical and chemical parameters of the waters. The water parameters observed were temperature, salinity, DO (Dissolve Oxygen), pH, and wind. The method used in this study is a survey method with in-situ measurement of water quality. 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. Salinity values ranged from 14 - 26 ppt with an average of 21.66 ppt. The water temperature at this observation location concluded that the results collected were the lowest temperature at around 27.5°C and the highest at 35.2°C. DO values are in the DO range of 6 – 8 mg/L.

Keyword : *Bojong salawe, Pangandaran,,physical parameter, water quality, Disolve Oxygen, pH, Salinity*

1. INTRODUCTION

Public waters are areas on the earth's surface that are permanently or occasionally inundated by water, including fresh, brackish, and marine water, extending from the lowest low tide line to land, and formed by natural or artificial waters. Among the most common are rivers, lakes, reservoirs, wetlands, and other bodies of water (Fajri & Kasry, 2013). About 75% of the earth's surface is covered by water, mainly ocean waters. The rest consists of fresh and brackish water. The term aquatic ecology refers to the reciprocal relationship of living things in water with the aquatic environment. Water is necessary for all living organisms, including plankton, benthos, and nekton. An estuary is a mixture of two bodies of water, fresh water and sea water, and is influenced by the physical properties of water such as seasons, tides, tides, temperature, and salinity [1]. 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.

Rivers are one of the most significant terrestrial aquatic environments to live in. Rivers offer water that ensures the long-term survival of human activities in the fields of fisheries, agriculture, industry, housing, and as a tourist

destination[2]. As a result, the use of different rivers can reduce the quality of the water. The river's natural ability to accept external waste inputs and self-purification of waste is built into its design. However, when the debris exceeds the carrying capacity of the river, it stops absorbing, resulting in a decrease in water quality. The Cijulang River is a popular ecotourism destination in Pangandaran, West Java, Indonesia. However, this river is home to various activities that have the potential to pollute the water, including Green Canyon cliff tourism, mangrove protection ecotourism, housing, and industrial sites [3].

The quality of water in a waters or estuary is an important thing that must be considered to determine the feasibility of living for marine organisms. So therefore, it is necessary to determine the status of water quality to monitor pollution based on the physical and chemical parameters of the waters. The water parameters observed were temperature, salinity, DO (Dissolve Oxygen), pH, and wind.

2. METHOD

The method used in this study is a survey method with in-situ measurement of water quality. In testing water quality parameters, there are several things that need to be measured in this study, because these are related to water quality parameters so there needs to be several correct measurement methods in accordance with the applicable standards. The first measurement is to measure water quality indicators, including DO, temperature, salinity, pH, wind, and bathymetry. The tools used in this research include:

1. DO Meter

Dissolved oxygen (DO or Dissolved Oxygen) is a measurement of the amount of mg/l oxygen gas dissolved in water. Usually this dissolved oxygen comes from photosynthesis by phytoplankton or other aquatic plants. Dissolved oxygen has a very important role in the life activities of an organism. The advantage of using a DO meter is that it is practical and easy to carry to the location, because the dissolved oxygen value will be read directly on the device. But before that, the calibration process is carried out first in order to obtain accurate data. To calibrate the DO meter, it can be done by disconnecting the Oxygen probe connection from the first instrument input socket, Turn on the power of the instrument by pressing the power OFF/ON button, pushing the O2/DO selector display to the O2 position, pressing the Zero button then the display will shows the value (0), then connect the Oxygen probe socket. to the DO tool input socket, wait a few minutes until it is stable and there are no fluctuations, then pressing the O2 cale button will display a value of 20.9 or 20.8 which is the value of oxygen in the air, so use this value for fast and thorough calibration. After the DO meter is calibrated, the next step is to find out how the DO meter works, the first step is to slide the O2/DO selector to the DO position, then dip the probe into the sample water to be studied, dip the probe until at least 10 cm so that the probe is affected by temperature, then so that the heat balance occurs between the probe and the measured water sample, at least wait one minute until the results are stable, shake it slowly to make it faster, after the DO meter is stable and there are numbers record these numbers as the dissolved Oxygen value in the area, after the measurement is complete, wash the probe thoroughly. be careful with aquades.

2. Anemometer

To detect wind speed in this study, a digital anemometer was used, where this anemometer is a device for detecting wind speed which is most widely used because it is economical and easy to find. The anemometer is not only used to measure, it can also be used to measure wind pressure and predict the weather. The anemometer that we use has a resolution of 0.1 m/s and to use this anemometer is very easy, just by holding the anemometer vertically in the direction where there is wind, then the numbers will automatically appear on the LCD screen. Anemometer is a tool that has an important role when you want to research related to wind speed and weather.

3. pH Meter

The degree of acidity of water (pH) is an indicator used to express the level of acidity or alkalinity possessed by a solution. Determining the pH value is very important, especially in testing water quality parameters, because it can help in determining whether the area has acidic or alkaline water quality. The degree of acidity is defined as the cologarithm of the activity of dissolved hydrogen ions (H+). The hydrogen ion activity coefficient cannot be measured experimentally, so its value is based on theoretical calculations. The pH scale is not an absolute scale. Some of the health effects if the pH level of the water is not balanced is the balance of acidity and alkalinity of the body, maintaining electrolyte levels, and a low pH of less than 7 (neutral) it will cause the water to become unstable and experience changes in color, smell and taste. Before using the pH meter, it must go through a calibration process, this can be done using a buffer solution so that the tool is calibrated and measurements at pH are accurate.

After going through the calibration process the pH meter is ready to use, to use the pH meter the first step is to take a sample of the water you want to measure the pH level for, then open the probe cover and turn on the pH meter by pressing the ON button, then insert the probe into the sample until it reaches the mark. limit, then wa it for approximately one minute until the resulting number is stable, use a stable number to determine the pH value, if the test is complete, lift the pH meter and clean the probe by dipping it into distilled water, the last step is to close the probe and put it in a safe place.

4. Refractometer

In testing water quality parameters, the refractrometer is used to determine the salinity value of a water. The refractometer that is widely used is the type of hand refractometer because it is easy to find and eas y to carry to distant areas. Refractometer is a tool to measure the concentration of substances that work with the help of the refractive index of light, the principle of this tool is to use the refractive index of light to determine the level of salinity of water, because it utilizes light, this tool must be used in places that get a lot of light or better if used under sunlight. sun. The refractometer reading scale unit is °Brix, which is the scale unit used for measuring dissolved solids content. Before using the refractophotometer, it needs to be calibrated first by opening the prism glass cover, then on top of the primed glass one or two drops of distilled water are dripped. The prism glass cover is then closed again slowly and ensure that the distilled water meets the surface of the prism glass. The refractometer is directed at a bright light. After calibration is complete, the prism glass is cleaned using tissue paper. After being calibrated the refractometer can be used in a way that before use, the refractometer is cleaned with a tissue pointing downwards. On the prism, the refractometer is dripped with drops of distilled water or 5% NaCl solution, the liquid is poured to coat the entire surface of the prism. Use a pipette to take the liquid you want to measure. Carefully close the refractometer by returning the plate to its initial position, then point it at the light then see the size of the salinity visible on the line where the white and blue sections meet.

5. Thermometer

A thermometer is a device for measuring temperature or temperature. Thermometers generally have an elongated shape and are equipped with a numeric scale that shows the temperature. Thermometers are used for research purposes such as wanting to know the freezing and boiling points of water, or the temperature of solids being heated, etc. This thermometer has a wide measuring range, which is a longer measurement range, for example 0°C - 35°C. Its use is also quite easy by cleaning the thermometer first before use, then position the floating thermometer so that it does not touch the container used, try not to touch the thermometer because it can change the results that come out on the thermometer, and lastly see / observe the results that come out on the thermometer.

3. RESULT

1. pH

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 [3]. Variations and changes in pH in estuaries can be caused by various things, such as bacterial activity, water turbulence, chemicals from river runoff, sewage overflow, and human activities, even acid rain. In addition, the sampling time also affects the pH because it is related to the photosynthesis process. Photosynthesis that occurs in the water will reduce the amount of CO2 in the water so that the pH can increase significantly. Therefore, the pH value of the estuary itself usually range s from 7.0 – 7.5 in fresher areas and 8.0 – 8.6 in saltier areas. The higher pH values at high salinity are due to the presence of natural buffers of water-soluble carbonates and bicarbonates.

2. Salinity

Data were collected using boats at five station points in June 2022 in the waters of Muara Bojong Salawe at 14.15 pm to 14.40 on the map with coordinates S -7.7159110 and E 108.4984000 showing values ranging from 14 - 26 ppt with an average of 21.66 ppt. In coastal areas, salinity data was also collected at three stations at 10.13 pm to 10.48 pm with coordinates S -7.716202 and E 108.5, values ranging 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. 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 [4], 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 ppt to 30 ppt and is divided into 3 types, namely oligohaline (0.5-5.0 ppt), mesohaline (5.0-18.0 ppt), or polyhaline (18.0 30.0 ppt). This salinity value belongs to polyhaline (18 – 30 ppt).

3. Wind

Based on the data obtained by classes A and B, the wind values obtained vary. The wind is obtained from the difference in air between two places. The higher the value of the difference in air pressure, the stronger the wind. In general, the wind speed in Indonesian waters is between 8 m/s to 10 m/s. If it is related to the wind speed obtained at several coordinate points, the wind speed value obtained has a low value which indicates that the wind in the estuary area has calm wind conditions (wind speed value X < 30 m/s) with favorable weather conditions.

4. 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 [5]. 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 [4]. 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. The temperature in water bodies is influenced by season, latitude, time of day, air circulation, cloud cover as well as water flow and depth [6]. The intensity of sunlight has a direct impact on the existing temperature fluctuations. Light that enters the waters will experience absorption and undergo changes to produce heat energy.

5. Dissolved 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. Dissolved oxygen content in ideal waters is in the range of 3-7 mg/L. Nevertheless, 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 [6].

4. CONCLUSIONS

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. Salinity values ranged from 14 - 26 ppt with an average of 21.66 ppt. The water temperature at this observation location concluded that the results collected were the lowest temperature at around 27.5°C and the highest at 35.2°C. DO values are in the DO range of 6 – 8 mg/L. this shows that the waters of the bojong salawe estuary are still within the threshold for water quality standards.

5. REFERENCES

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