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ANALYSIS OF WATER QUALITY STATUS OF KARANG MUMUS RIVER SEGMENT GUNUNG LINGAI DAN GELATIK SAMARINDA

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ABSTRACT

Analysis of Water Quality Status of Karang Mumus River Segment Gunung Lingai dan Gelatik Samarinda. Water is a basic need for plants, animals, and humans. All daily activities require water, both as drinking water and as a fulfillment of needs in daily activities. The main problem is that surface water is often polluted, reducing water quality. The research was conducted using descriptive research methods with a quantitative approach. The results of the measurements of the eight water parameters of the Karang Mumus River in the Gunung Lingai Segment are TSS 39 mg/L, BOD 1.575 mg/L, COD 38.657, nitrate 0.137 mg/L, phosphate 0.085 mg/L, DO 2.925, fecal coli 81600/100 ml water, and pH 7.615. The measurement results of the Karang Mumus river water parameters in the Gelatik Segment are TSS 32.2 mg/L, BOD 1.75 mg/L, COD 21.701, nitrate 0.129 mg/L, phosphate 0.077 mg/L, DO 3.25, fecal coli 231200/100 ml water, and pH 6.67. The research results on the Karang Mumus River, Segments of Gunung Lingai and Gelatik, showed the same results. Calculation of the water quality status of the Karang Mumus River in the Gunung Lingai segment shows a value of 7.577. This value is included in the category of moderate contamination. Calculation of the water quality status of the Karang Mumus River in the Gelatik Segment is also included in the moderately polluted category with a pollution index value of 9.173.

INTRODUCTION

Water is a basic need for living creatures, both plants, animals and humans. All daily activities certainly require water, both as drinking water and to fulfill needs in daily activities or what is usually called hygiene sanitation. In Indonesia, one of the natural resources that is often used for community activities in urban areas is surface water such as rivers. Rivers are sources of surface water that provide benefits to human life (1).

Currently, the main problem faced is that surface water is often polluted, thereby reducing water quality. River quality is influenced by various activities and human life. Some river pollution is of course caused by the life around it, both the river itself and human behavior as river users (1). As a result of the increase in development activities in various fields, either directly or indirectly, it will have an impact on environmental damage, including river pollution (2).

Physically, the Karang Mumus River is dirty, blackish brown in color, filled with rubbish scattered in the river flow, and emits a foul smell. In certain months there is a phenomenon

that residents often call fish bangai where fish appear on the surface of the water as a result of abnormal acidity levels. (3). The existence of settlements and other activities near the Karang Mumus River makes the river high in E. coli. Community activities produce waste which ultimately pollutes rivers (4).

Near the middle of the river, various socio-economic activities occur. Samarinda city center is located here, and there are many markets, shopping centers, hospitals and hotels nearby. The river is dirty and there is a lot of rubbish in it. The water is cloudy and smells bad. Bathing, washing and toilet activities are often carried out by residents of riverside settlements on the river, because the Karang Mumus River flows downstream and is influenced by the tides of the Mahakam River. The condition of the river looks beautiful, and the flow is calm. Here you can see small boats for transportation, because there is a harbor near the mouth of the Karang Mumus River. Land use is dominated by densely populated settlements, but settlements are not located on riverbanks because they have previously been resettled (4).

Judging from the conditions described by the researchers above, it is necessary to carry out research related to water pollution in the Karang Mumus river. The research aims to analyze the water pollution index and the water quality status of the Karang Mumus river and to look at the sources of pollution at the research location, namely the Mount Lingai and Gelatik segments. The research carried out is relatively new, especially on the Karang Mumus river with the parameters to be measured, namely pH, Total Suspended Solid (TSS), Dissolved Oxygen (DO), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), total phosphate, nitrate, and fecal coli.

MATERIALS AND RESEARCH METHODS

The research was conducted using descriptive research with a quantitative approach. A quantitative approach was taken for the river water pollution index for the Mount Lingai and Gelatik segments. The parameters analyzed are TSS, pH BOD, COD, DO, Nitrate, Phosphate and Fecal Coli. This research analyzes secondary data from the Samarinda City Environmental Service.

RESULTS OF RESEARCH AND DISCUSSION

Calculation of the Water Quality Status of the Karang Mumus River Segment of Mount Lingai

The calculation of the water quality status of the Karang Mumus river in the Mount Lingai segment is carried out based on Minister of Environment Decree Number 115 of 2003 concerning guidelines for determining water quality status. Water quality status calculations are carried out based on the results of concentration calculations for 8 parameters. The measurement results of the eight parameters can be seen in Table 1.

Table 1.Distribution of Water Parameter Measurement Results for the Karang Mumus River Segment of Mount Lingai

No	Parameter	Unit	Measurement results	SBM	Ci/Lij
1.	TSS	mg/L	39	50	0.78
2.	pH	mg/L	7,615	6-9	0.083
3.	BOD	mg/L	1,575	3	0.525
4.	COD	mg/L	38.6575	25	1,946
5.	DO	mg/L	2,925	4	0.3396
6.	Nitrate	mg/L	0.137	10	0.0137
7.	Phosphate	mg/L	0.085	0.2	0.425
8.	*Fecal coli*	MPN/100 ml	81600	1000	10,558
Average					1,834
Pollution Index (IP)					7,577

Source: Samarinda City Environmental Service

Information: SBM= Quality Standard Standard

The results of measuring the eight water parameters of the Karang Mumus river in the Mount Lingai segment, namely TSS 39 mg/L, BOD 1.575 mg/L, COD 38.657, nitrate 0.137 mg/L, phosphate 0.085 mg/L, DO 2.925, fecal coli 81600/ 100 ml of water, and pH 7.615. The measurement results show that of the eight parameters measured, there are two parameters that have exceeded the quality standards, namely COD and fecal coli.

The concentrations of water parameters that have been obtained are used in the process of calculating the water quality status of the Karang Mumus river in the Mount Lingai segment. Based on the quality status calculation referring to Minister of Environment Decree Number 115 of 2003, it is known that the river water quality status in this segment is in the moderately polluted category. The calculated value obtained is 7.577. The results obtained are in line with research which states that the results of calculating the water quality status of the Batang Salido river at point 2 are included in the moderate pollution category. (5).

The water parameters that have dominant values in the Mount Lingai segment are Chemical Oxygen Demand (COD) and fecal coli. The COD concentration in the Mount Lingai segment was 38.6575 mg/L, and fecal coli was 81600 MPN/100 ml water. Research conducted by Yohanes Beny shows that the water quality status of the Kerukut River is in moderately polluted condition with high parameters, namely fecal coli (6). The high concentration of fecal coli in river water is caused by the large number of feces entering the river (7). This condition shows that the Karang Mumus river area in the Mount Lingai segment still has community activities close to the river. There are activities that have the potential to increase the level of fecal coliforms, such as defecating on riverbanks.

Another parameter that has exceeded the quality standards for river water in the Mount Lingai segment is Chemical Oxygen Demand (COD). The COD concentration in river water measured was 38.6575 mg/L. The high concentration of COD is due to the large amount of organic material in the waters. A study states that the high COD in river water is caused by the accumulation of household waste which is difficult to decompose (8).

Calculation of the Water Quality Status of the Karang Mumus River, Gelatik Segment

Calculations of the water quality status of the Karang Mumus river were also carried out in the Gelatik segment. Calculation of the water quality status of the Gelatik segment of the river was also carried out based on the results of water parameter measurements carried out by the Samarinda City DLH. The results of measuring river water parameters in the Gelatik segment are presented in Table 2.

Table 2. Distribution of Water Parameter Measurement Results for the Karang Mumus River, Gelatik Segment

No	Parameter	Unit	Measurement results	SBM	Ci/Lij
1.	TSS	mg/L	32.2	50	0.65
2.	pH	mg/L	6.67	6-9	0.356
3.	BOD	mg/L	1.75	3	0.525
4.	COD	mg/L	21,701	25	0.868
5.	DO	mg/L	3.25	4	0.312
6.	Nitrate	mg/L	0.129	10	0.013
7.	Phosphate	mg/L	0.077	0.2	0.385
8.	*Fecal coli*	MPN/100 ml	231200	1000	12,819
Average					1,991
Pollution Index (IP)					9,173

Source: Samarinda City Environmental Service
Information:
SBM= Quality Standard Standard

The calculation of the water quality status of the Karang Mumus river for the Gelatik segment obtained a value of 9.173. This value shows that the water in the Gelatik segment is classified as moderately polluted. The parameter that does not meet quality standards in the Wren segment is fecal coli. Similar to the results found in the Mount Lingai segment, the fecal coli value for the Gelatik segment exceeded the quality standard, namely 231,200 MPN/100 ml of water.

Environmental conditions in the Gelatik segment, there are still many settlements found on the banks of the Karang Mumus river. The existence of settlements on riverbanks has the potential to cause a pollution burden on river water. The presence of settlements and other activities near the Karang Mumus River makes the river high in E. coli. Community activities that produce waste ultimately pollute rivers [9]. Dense settlements on the banks with people defecating in the river, chicken slaughtering activities and animal husbandry can increase the number of fecal coliforms in the water. [10].

Another factor that influences fecal coli levels in river water is season. The concentration of fecal coli will appear higher in the dry season than in the rainy season.The higher levels of microbiological parameters in the dry season compared to the rainy season can be caused by the higher rate of water runoff in the rainy season so that bacteria are more easily washed away by river water flow, while in the dry season the bacteria can settle and reproduce well.[11].

CONCLUSIONS AND RECOMMENDATIONS

The results of research on Krangmumus river water in the Mount Lingai and Gelatik segments showed the same results. Calculation of the water quality status of the Karang Mumus river for the Mount Lingai segment shows a value of 7.577. This value is included in the moderate pollution category. The calculation of the water quality status of the Karang Mumus river in the Gelatik segment is also included in the moderate pollution category with a pollution index value of 9.173. Parameters that do not meet quality standards in the Mount Lingai segment are fecal coli and COD. Meanwhile, in the Wren segment, the parameter that does not meet quality standards is fecal coli. Community assistance and the provision of infrastructure really support efforts to overcome river pollution from rubbish and latrines on riverbanks.

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