

WATER QUALITY STATUS BASED ON POLLUTION INDEX TO MEET THE NEEDS OF SANITARY HYGIENIC WATER FOR COMMUNITIES AROUND LAKE SENTANI IN JAYAPURA REGENCY

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Abstract: Water is one of the most important elements on earth. Water is needed by all living things, both humans, plants and animals. Consuming clean and sanitary water is absolutely necessary to avoid unwanted negative impacts. This research was conducted in February 2022 and aims to determine the status of the water quality of Sentani Lake, Jayapura Regency based on the pollution index according to the hygienic and sanitary water quality standards according to the Regulation of the Minister of Health of the Republic of Indonesia Number: 32 of 2017 concerning Environmental health quality standards and water health requirements for sanitation hygiene needs, swimming pools, solus per aqua and public baths. The study used 15 (fifteen) water pollution parameters, namely: physical parameters (turbidity, color, TDS and temperature), and chemical parameters (pH, iron, fluoride, hardness, manganese, nitrate, cyanide, detergent and total pesticides) as well as biological parameters (total coliforms and *E. coli*). The samples in this study were taken from 5 (five) sample points (research stations) namely the mouths of the Haway, Yabawi, Hobay and Kamwalker Rivers which are the inlet of Sentani Lake and the headwaters of the Jaifuri River which is the outlet. The results showed that at stations 1, 2, 3, 4 and 5, the pollution index (PIj) was 4.07; 3.10; 2.30; 3.75 and 3.88, all of which are in the range of values of $1 \leq PIj \leq 5$ with lightly polluted status. This standard was based on the Regulation of the Minister of Health of the Republic of Indonesia Number: 32 of 2017 especially environmental health quality standards and water health requirements for sanitation hygiene purposes. Thus it can be concluded that the water quality status of Sentani Lake based on the pollution index method is in the lightly polluted category.

Keywords: *Status, index, pollution, Lake, Sentani.*

INTRODUCTION

Water is one of the components of the environment that is very important for development and growth not only for humans, but also for other living things. Especially for humans, in daily life, water is used for drinking, cooking, bathing, washing and for other needs such as farming and growing fish for farmers or other activities. The high population growth has resulted in not all components of society being able to enjoy clean water. In terms of public health, the need for water for sanitary hygiene purposes, swimming pools, SPA, and public baths must meet the quality requirements so that public health is guaranteed. Good use of water is in accordance with its designation based on water quality status in accordance with the regulation of the state minister of the environment number: 115 of 2003 concerning Guidelines for Determining Water Quality Status. (Alihar, 2018, p. 68) (Alihar, 2018, p. 68) (Literat & Indonesia, 2020).

The availability of water on Earth is always permanent, meaning that it does not experience additions or subtractions because water undergoes a hydrological cycle and only it changes its forms. Although the amount of water on Earth is always fixed, the quality of water changes along with the growth of the number of human populations and the activities that accompany them. The Pollution Index (IP) is determined for an allotment, then it can be developed for several designations for all parts of a body of water or part of a River. The Pollution Index (IP) includes various

groups of independent and meaningful quality parameters. Water quality on the basis of the Pollution Index (IP) can provide input to decision makers in order to assess the quality of water bodies for an allotment and take actions to improve quality if there is a decrease in quality due to the presence of polluting compounds, in addition to water for Sanitary Hygiene Purposes is water of a certain quality used for daily purposes which quality is different from the quality of drinking (Storet, 2016, p. 9) (Storet, 2016, p. 9) (Literat & Indonesia, 2020).

Water quality is a condition of water quality that is measured and or tested based on certain parameters and certain methods of applicable laws and regulations. Water quality status is the level of water quality conditions that indicate polluted conditions or good conditions of the water source within a certain time by comparing to the established water quality, while healthy environmental quality is determined through the achievement or fulfillment of Environmental Health Quality Standards and Health Requirements (Storet, 2016, p. 2) (Storet, 2016, p. 2) (Literat & Indonesia, 2020).

Environmental Health Quality Standards for Water media for Sanitary Hygiene Purposes include physical, biological, and chemical parameters that can be both mandatory parameters and additional parameters. Mandatory parameters are parameters that must be periodically checked in accordance with the

provisions of laws and regulations, while additional parameters are only required to be checked if geohydrological conditions indicate the presence of potential pollution related to additional parameters. Water for Sanitary Hygiene Purposes is used for the maintenance of individual hygiene such as bathing and toothbrushes, as well as for the purposes of washing foodstuffs, cutlery, and clothing. In addition, Water for Sanitary Hygiene Purposes can be used as raw drinking water (Literate & Indonesia, 2020).

Geographically, Sentani Lake is located in Jayapura Regency at coordinates 140°23'-140°50' BT and 2°31'-2°41' LS. Sentani Lake is located in the south of Sentani City which is the capital of Jayapura . This lake has an area of about 9,630 ha and is located at an altitude of 72 m above sea level. Sentani lake has 5 Rivers as its inlet, namely the Hawaii, Yamolo, Klandeli, Dofroko and Hobay and has one discharge (outlet) namely the Jaifuri River with a water discharge of 8,024 m³/s (Syariz, 2015, p. 2) (Burhanuddin et al., 2018, pp. VIII-56)³/s. The closest distance between the inlet and the outlet is 28 km² with a stationary time of 5 to 7 days. The excessive utilization and lack of maintenance of the Sentani lake are the causes of a decline in water quality. These conditions have been created pollution, sedimentation and other damages. Pollution of the waters of Sentani Lake is caused by the discharge of domestic

waste of residential areas around the lake and discharges (oil from diesel power station, hospital waste discharges, and so on) In their daily lives, the people on the outskirts of Sentani Lake use the lake as a place to catch fish and also as a recreational place, besides that they also use it to meet the needs of Sanitary Hygiene such as MCK (bathing, washing and latrines). Its use for Sanitary Hygiene should meet the requirements set forth in the Regulation of the Minister of Health of the Republic of Indonesia Number: 32 of 2017 concerning Environmental health quality standards and water health requirements for the purposes of sanitary hygiene, swimming pools, solus per aqua and public baths (Syariz, 2015, p. 2).

The first purpose of this study is to determine water quality of Sentani Lake in terms of physical, chemical and biological parameters and encode it with Sanitary Hygiene Water Quality Standards. The second purpose is to determine the water quality status of Sentani Lake based on Sanitary Hygiene Water Quality Standards. The benefits of this research result as information material to the coastal community of Sentani Lake as water users for Sanitary Hygiene. As input to the Regional Governments of Jayapura Regency and Jayapura City in the context of better management of lake water.

MATERIALS AND METHODS

This type of research carried out is a type of experimental research with tests

inside the laboratory and at the site of research on water based on the test

parameter or parameters studied. While the type of data obtained is primary data is quantitative from water quality parameters. Water samples that have been taken are then tested on water quality parameters by methods according to SNI 06-2412-199. Water quality data that has been obtained and in accordance with the parameters

studied are then carried out treatment and analysis in accordance with the provisions of the Decree of the Minister of Environment of the Republic of Indonesia Number: 115 of 2003 concerning Guidelines for Determining Water Quality Status (Directorate General Source Power Air Department Work Common, 2009).

RESULTS AND DISCUSSION

Sentani Lake Water Quality

Guided by the Regulation of the Minister of Health of the Republic of Indonesia Number 32 of 2017, environmental health quality standards and water health requirements for sanitary hygiene purposes are 6 mandatory parameters of physics, 10 mandatory parameters of chemistry and 2 mandatory parameters of biology. Sanitary water can also be used to meet the needs of drinking water.

Discussion of Physics Index Parameters:

Table 1. Water Quality Test Results of Sentani Lake Water Physics Parameters

No	Parameter	Research Station					Quality Standards
		I (Haway)	II (Yabawi)	III (Hobay)	IV (Waena)	In (Jaifuri)	
1	Turbidity	210	21	67	34	189	25
2	Color	36	25	57	61	18	50
3	TDS	121	189	682	1.989	98	1.000
4	Temperature	30,6	29,90	29,40	29,10	31,80	27-33
5	Taste	Not Feeling	Not Feeling	Not Feeling	Not Feeling	Not Feeling	Not Feeling
6	Construction	Odorless	Odorless	Odorless	Odorless	Odorless	Odorless

The results of the physical parameters test in table 1 can be further elaborated by comparing them with sanitary hygiene water quality standards in accordance with Health Ministry Regulation Number 32 of 2017 as follows.

1. Turbidity

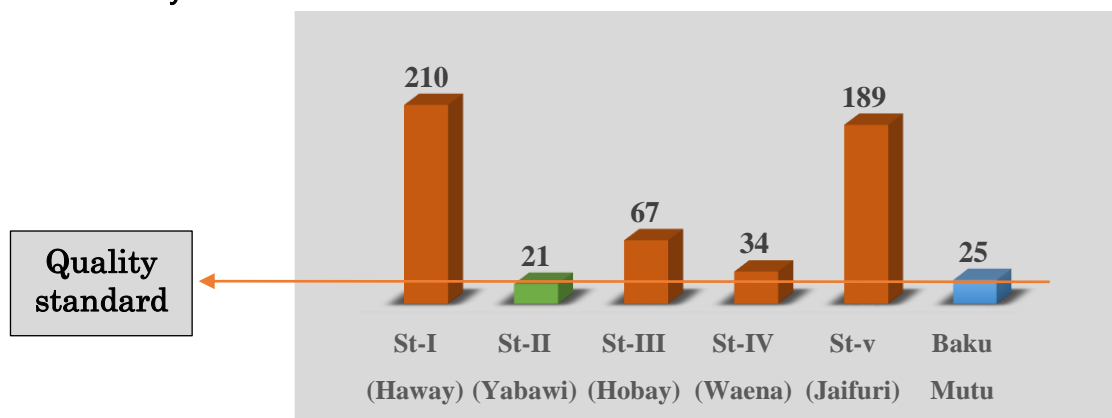


Figure 1. Diagram of Sentani Lake Water Turbidity Index Parameter

As per table 6 mentioned above, it can be explained that the permitted Water Quality Standard is a maximum of 25 NTU, thus only at station II (the mouth of the Yabawi River) that meets the requirement of 21 NTU. While at Station I (the mouth of the

Haway River) the turbidity level is the highest at 210 NTU. This high level of turbidity is due to erosion and landslides that occur due to rain in the Cyclops Mountain area.

2. Color

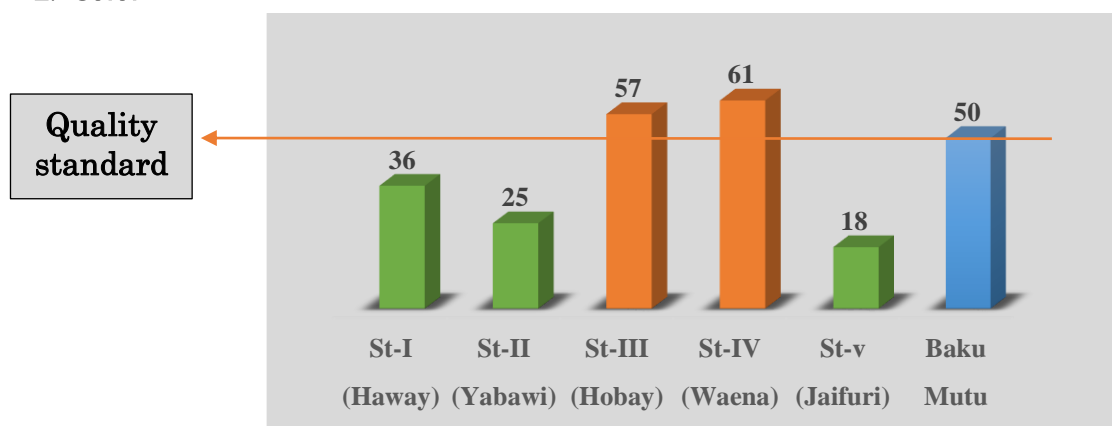


Figure 2. Diagram of Sentani Lake Water Color Index Parameter

The maximum limit of color parameter values allowed by the Minister of Health of the Republic of Indonesia Number 32 of 2017 is 50 TCU. There are two stations that obtained color parameter values exceeding the maximum limit, namely station III (the mouth of the Hobay River) of 57 TCU due to illegal gold panning waste by the community and station IV (the mouth of the Kamwalker Waena River) of 61 TCU

which is due to domestic waste from the settlement of Perumnas 1 and also waste from slaughterhouses in the Yoka area. The test results also showed that at the V station (upstream of the Jaifuri Yoka River) showed that the color quality had improved by 18 TCU, this is because the length of time the water stays 5-7 days causes particles that cause the color to decompose and settle so that the water is clearer.

3. Total Dissolved Solids (TDS)

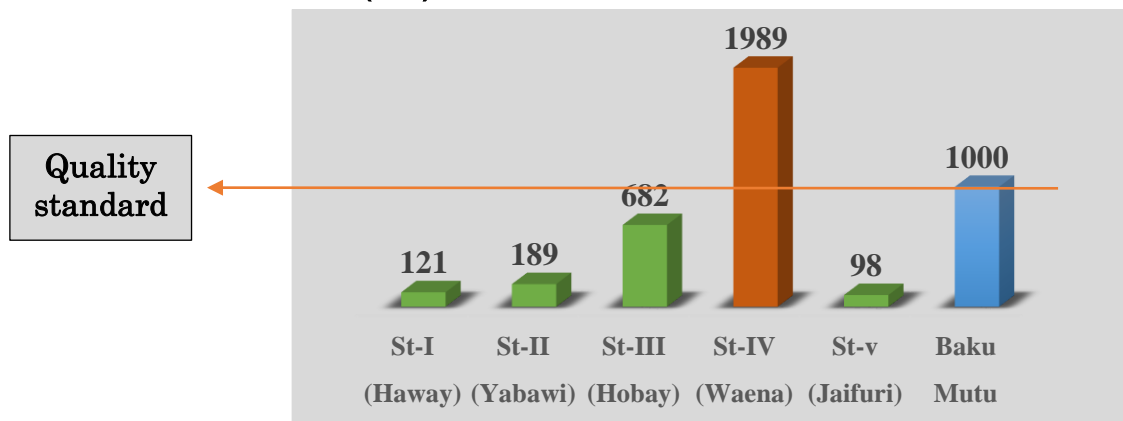


Figure 3 : Diagram of Sentani Lake Water TDS Index Parameters

It appears in table 8 that for the parameters of Total Dissolved Solids (TDS), station IV (the mouth of the Kamwalker Waena River) obtained the highest value of 1,989 mg / L while the maximum allowable Water Quality Standard was 1,000 mg / L. This condition is due to the presence of domestic waste and particles of solutes from the Kamwalker River. As for the other stations, they meet the requirements when compared to sanitary hygienic water quality standards.

4. Temperature

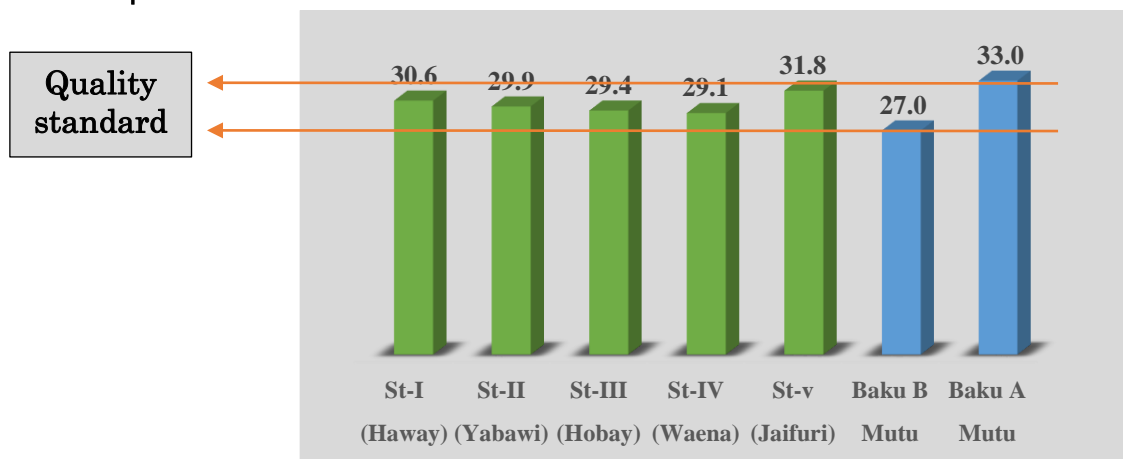


Figure 4. Diagram of Sentani Lake Water Temperature Index Parameter

The results of the temperature parameter test for all stations still meet the requirements of sanitary hygienic water quality standards. The air temperature of the study site is 30°C for a range of ± 3°C, then the allowable temperature ranges from 27°C to 33°C.

5. Taste

For the taste index parameters of all stations the water is tasteless, thus meeting the requirements as sanitary hygienic drinking water raw water.

6. Construction

Likewise, the odor parameters of all stations give the result that the water is odorless

which means it also meets the requirements of sanitary hygienic water.

Discussion of Chemical Index Parameters:

Table 2. Chemical Parameters Water Quality Test Results of Sentani Lake

No	Parameter	Research Station					Quality Standards
		I (Haway)	II (Yabawi)	III (Hobay)	IV (Waena)	In (Jaifuri)	
1	pH	7,90	8,10	7,30	8,70	7,60	6,5-8,5
2	Iron	0,06	0,06	0,37	0,33	0,05	1,00
3	Flourida	0,23	0,14	0,13	0,16	0,11	1,50
4	Hardness	347	329	412	341	216	500
5	Manganese	0,01	0,03	0,01	0,02	0,01	0,50
6	Nitrate	0,04	0,46	0,60	0,32	1,05	10,00
7	Nitrite	0,07	0,22	0,22	0,42	0,12	1,00
8	Cyanide	0,04	0,07	0,03	0,06	0,04	0,10
9	Detergent	0,19	0,03	0,13	0,08	0,06	0,05
10	Total Pesticides	0,03	0,06	0,01	0,03	0,03	0,1

The test results of the 10 chemical parameters in table 10 will then be further elaborated by comparing them with sanitary hygiene water quality standards in

accordance with the Regulation of the Minister of Health Number 32 of 2017 as follows:

1. pH

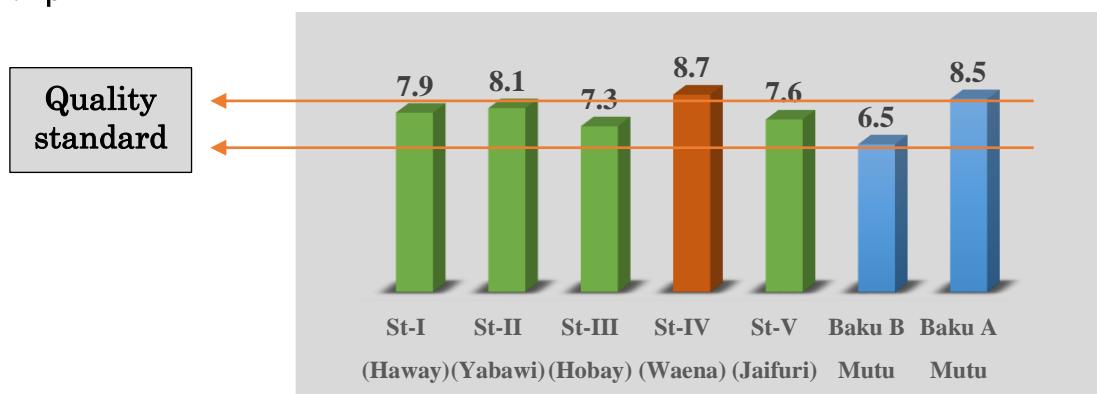


Figure 5. Diagram of Sentani Lake Water pH Index Parameter

In figure 6 mentioned above it appears that station IV (the mouth of the Kamwalker

Waena River) the pH of the water is 8.7 above the threshold value of 8.5. This

condition is due to the presence of waste from the Slaughterhouse in Yoka Village. While for the other stations, they meet the

requirements of sanitary hygienic water quality standards.

2. Iron

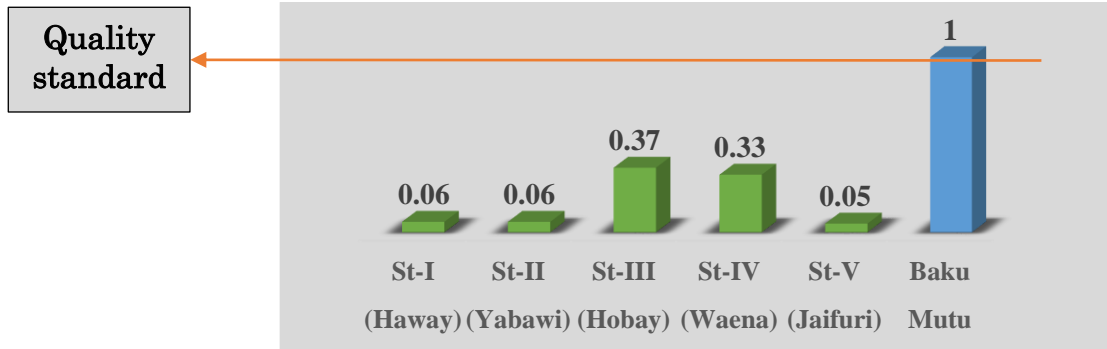


Figure 6. Diagram of Sentani Lake Water Iron Index Parameter

The maximum iron content for sanitary hygienic water is 1 mg / L, while the water test results at all stations are less than 1

mg/L. Thus for all its water stations it qualifies as sanitary hygienic raw water.

3. Flourida

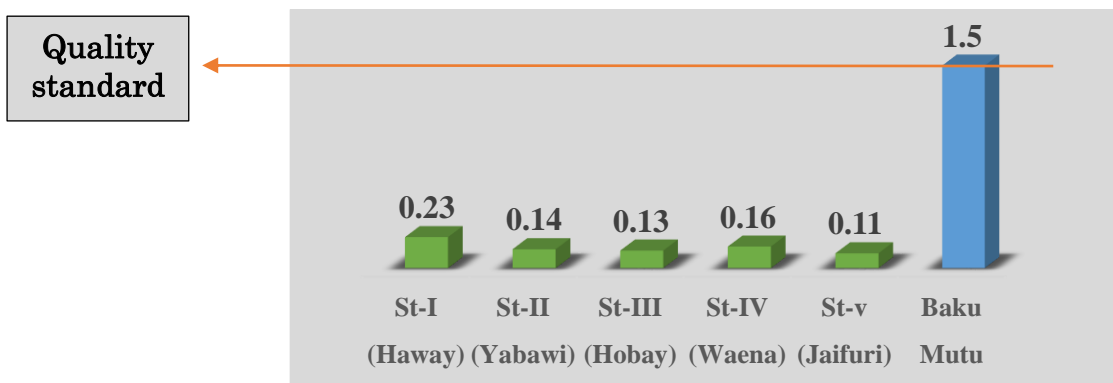


Figure 7. Diagram of Sentani Lake Water Flouride Index Parameter

Similar to iron parameters, all stations obtained flouride content well below the sanitary hygiene water quality standard

threshold of 1.5 mg/L. Thus the lake water at all stations is qualified as sanitary hygienic drinking water raw wate.

4. Hardness

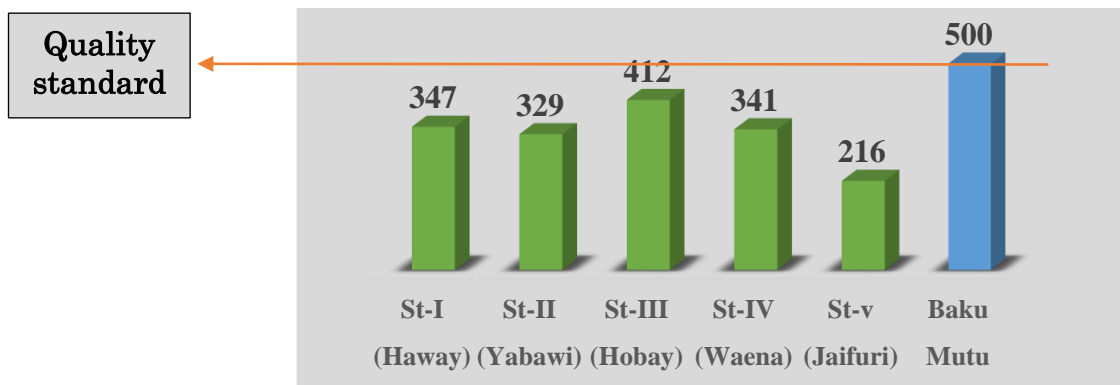


Figure 8. Diagram of Sentani Lake Water Hardness Index Parameter

Figure 9 provides information that for the hardness parameters all stations qualify as

sanitary water hygiene, this is because their hardness is below the threshold of 500 mg/L.

5. Manganese

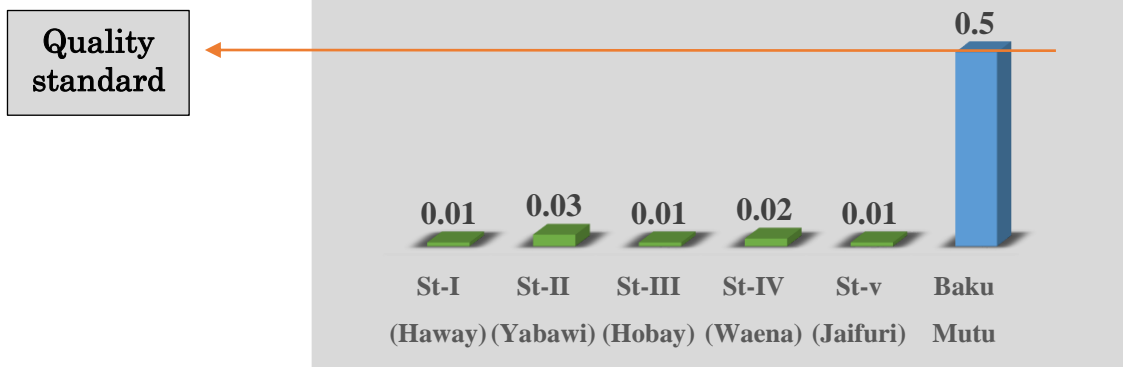


Figure 9. Diagram of Sentani Lake Water Manganese Index Parameter

The maximum manganese content of sanitary hygienic water is 0.5 mg/L, while the results of the sentani lake water test in all stations obtained results much smaller

than the threshold value. Thus it can be said that for manganese parameters, lake water in Sentani qualifies as sanitary hygienic raw water.

6. Nitrate

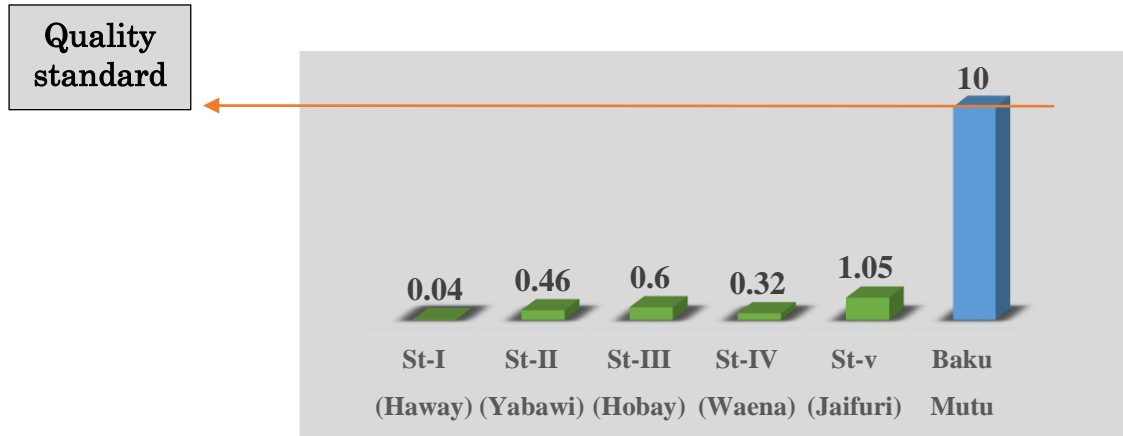


Figure 10. Diagram of Sentani lake Nitrate-N Index Parameters

Likewise, for the Nitrate – N parameter, the maximum quality standard is 10 mg / L, while the water test results in all stations obtain results much smaller than the

threshold limit of 10 mg / L. Thus lake water Sentani for the Nitrate–N parameter qualifies as sanitary hygienic water

8. Nitrite

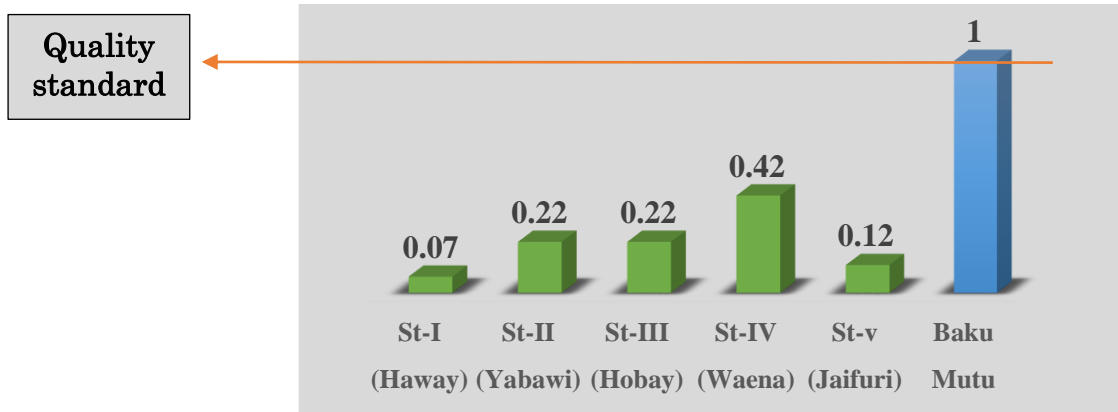


Figure 11. Diagram of Sentani Lake Water Nitrite-N Index Parameter

Figure 12 it appears that for the nitrite-N parameters at all stations are well below the sanitary hygiene raw water threshold

limit of 1 mg/L. This shows that sentani lake water for nitrite parameters qualifies as sanitary hygiene water.

9. Cyanide

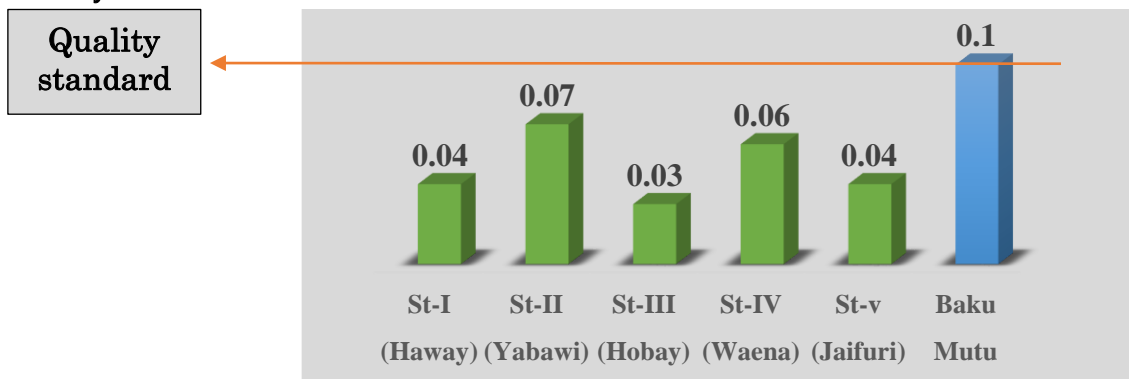


Figure 12. Diagram of Sentani Lake Water Cyanide Index Parameter

The cyanide index parameter of sanitary hygienic raw water is 0.1 mg / L, while the results of the sentani lake water quality test against the cyanide parameter

give results far below the threshold limit, so it can be said that Sentani lake water for cyanide parameters qualifies as sanitary hygienic water.

10. Detergent

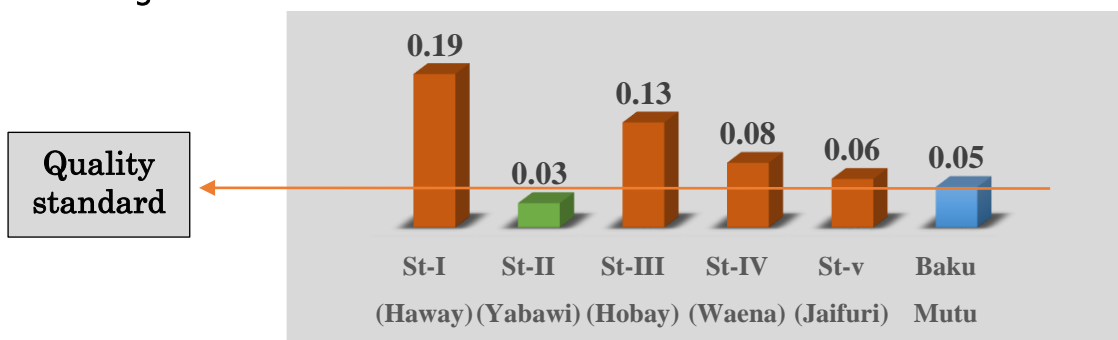


Figure 13. Diagram of Sentani Lake Water Detergent Index Parameter

Except at station II (the mouth of the Yabawi River) the detergent index parameter exceeds the threshold limit of 0.05 mg / L. Even at station I the level reaches 0.19 mg / L, followed by station III of 0.13 mg / L then stations IV and V. Thus Sentani Lake water generally the detergent content exceeds the threshold allowed by

the Minister of Health of the Republic of Indonesia Number 32 of 2017. This condition is due to the large use of detergents for washing purposes by people who live on the shores of Sentani Lake, even the burden of pollutants from Rivers flowing into Sentani Lake is quite high.

11. Total Pesticides

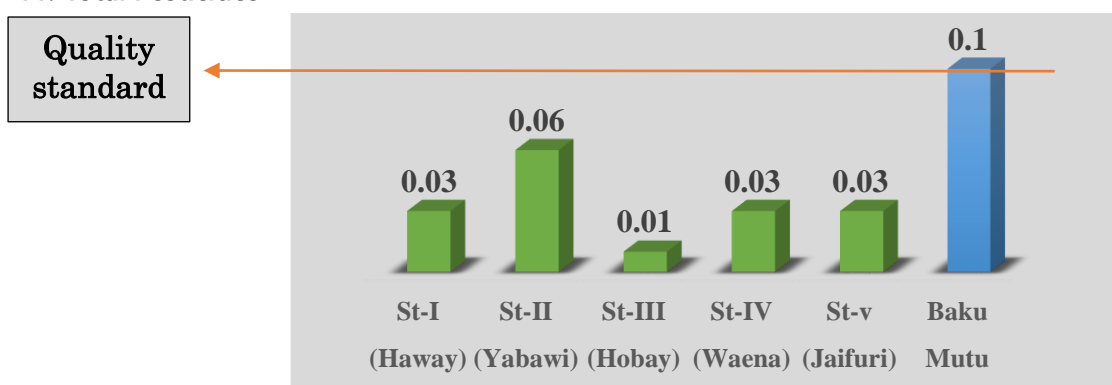


Figure 14. Diagram of Sentani Lake Total Pesticide Index Parameter

At the figure 15 above It appears that the total pesticide content at all stations is still far below the threshold limit of 0.1 mg /L.

Thus for the total pesticide parameters the Sentani Lake water qualifies as sanitary hygienic water.

Discussion of Biological Index Parameters:

Table 3. Biological Parameters Water Quality Test Results of Sentani Lake

No	Parameter	Research Station					Quality Standards
		I (Haway)	II (Yabawi)	III (Hobay)	IV (Waena)	In (Jaifuri)	
1	Total coliform	245	231	38	341	210	50
2	<i>E. coli</i>	67	12	23	46	37	0

1. Total coliform

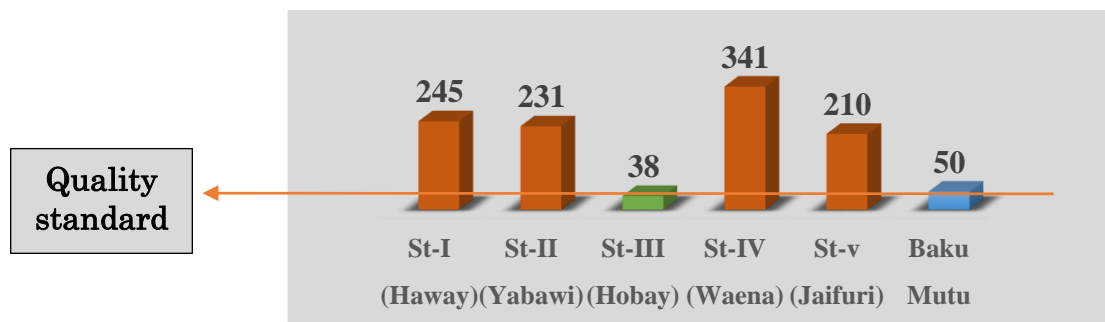


Figure 15. Diagram of Sentani Lake Total Coliform Index Parameter

The total coliform data listed in table 22 shows that, only Sentani Lake water at station III (the mouth of the Hobay River) qualifies as sanitary hygienic raw water, while at the other 4 stations the total coliform index parameter is higher than the threshold limit of 50 CFU / 100 mL. The high

parameters of the total coliform index at station I, station II and station IV are due to the presence of domestic waste that is directly discharged into Sentani Lake. Likewise, at station V (Sentani Lake outlet) the total coliform content is still quite high.

2. *E. coli*

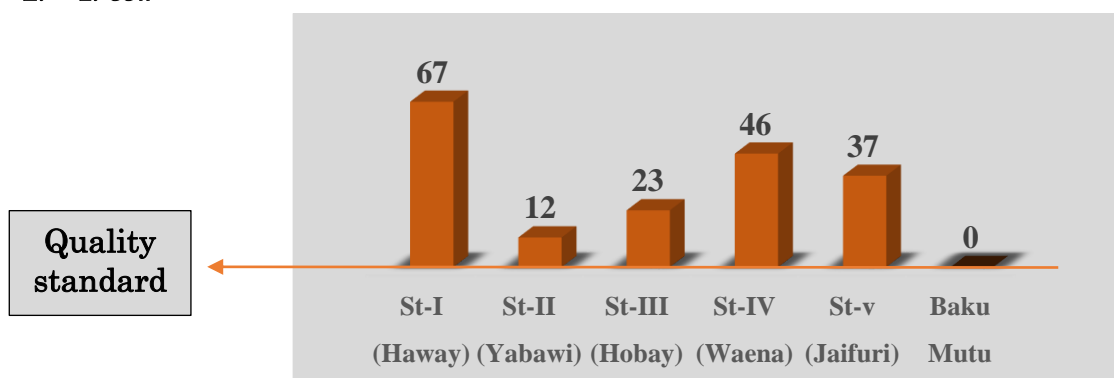


Figure 16. Diagram of Sentani Lake *Escherichia coli* Index Parameter

For sanitary hygiene purposes, water should be free from *Escherichia coli* or *E. coli* content equal to 0. However, the test results showed that all stations had *E. coli*, even at station I (the mouth of the Haway River) the content was quite high,

then station IV, station V, station III and station II. The content of *E. coli* is due to the presence of human and animal fecal waste which is directly spiked into the waters of Sentani Lake.

Water Quality Status of Sentani Lake

The following description will be presented about the results of the calculation of the water quality status of Sentani Lake at 5 (five) stations (location points) and the comparison of water quality statuses to five stations (location points) and their discussion.

Table 4. Water Quality Status of Sentani Lake at Station 1

No	Parameter	C _i	L _{ix}	Unit	C _{and} /L _{ix}	C _i /L _{ix} (new)
1	Turbidity	210	25	NTU	8,40	5,62
2	Color	36	50	TCU	0,72	0,72
3	TDS	121	1.000	mg/L	0,12	0,12
4	Temperature	30,6	30	oC	1,02	1,04
5	pH	7,9	7,5	-	1,05	1,11
6	Iron	0,06	1	mg/L	0,06	0,06
7	Flourida	0,23	1,5	mg/L	0,15	0,15
8	Hardness	347	500	mg/L	0,69	0,69
9	Manganese	0,01	0,5	mg/L	0,02	0,02
10	N-nitrate	0,04	10	mg/L	0,00	0,00
11	Nitrite-N	0,07	1	mg/L	0,07	0,07
12	Cyanide	0,04	0,1	mg/L	0,40	0,40
13	Detergent	0,19	0,05	mg/L	3,80	3,90
14	Total Pesticides	0,03	0,1	mg/L	0,30	0,30
15	Coliform Total	245	50	CFU/100 mL	4,90	4,45
Sum						18,67
Average						1,24
Maximum						5,62
P _{ij}						4,07
Information (water quality status)			Lightly polluted (slightly polluted)			

The results of the analysis of 15 parameters from station 1 (the mouth of the Haway River in Sentani City) obtained a pollution index (P_{ij}) of 4.07. This value is in accordance with the Regulation of the Minister of Environment of the Republic of Indonesia Number 115 of 2003 concerning Guidelines for Water Quality Status in index

class $1 \leq P_{ij} \leq 5$, which means that the category is lightly polluted. There are 3 parameters that exceed the threshold value, namely turbidity, total coliform and detergent due to the large amount of erosion that occurs along the River and high (domestic) home waste disposal in the form of feces and others.

Table 5. Water Quality Status of Sentani Lake at Station Kampung Harapan Sentani

No	Parameter	C _i	L _{ix}	Unit	C _{and} /L _{ix}	C _i /L _{ix} (new)
1	Turbidity	21	25	NTU	0,84	0,84
2	Color	25	50	TCU	0,50	0,50

3	TDS	189	1.000	mg/L	0,19	0,19
4	Temperature	29,9	30	oC	1,00	0,99
5	pH	8,1	7,5	-	1,08	1,17
6	Iron	0,06	1	mg/L	0,06	0,06
7	Flourida	0,14	1,5	mg/L	0,09	0,09
8	Hardness	329	500	mg/L	0,66	0,66
9	Manganese	0,03	0,5	mg/L	0,06	0,06
10	Nitrate	0,46	10	mg/L	0,05	0,05
11	Nitrite	0,22	1	mg/L	0,22	0,22
12	Cyanide	0,07	0,1	mg/L	0,70	0,70
13	Detergent	0,03	0,05	mg/L	0,60	0,60
14	Total Pesticides	0,06	0,1	mg/L	0,60	0,60
15	Coliform Total	231	50	CFU/100 mL	4,62	4,32
Sum						11,05
Average						0,74
Maximum						4,32
Plj						3,10
Information (water quality status)				Lightly polluted (slightly polluted)		

The results of the analysis of 15 parameters from station 2 (the mouth of the Yabawi River in Kampung Harapan) obtained a pollution index (Plj) of 3.10. This value is in accordance with the Regulation of the Minister of Environment of the Republic of Indonesia Number 115 of 2003 concerning Guidelines for Water Quality

Status is in index class $1 < Plj \leq 5$, which means that the category is lightly polluted. There is 1 parameter that exceeds the threshold value, namely the total coliform where the coastal communities of the lake dump their domestic waste directly into the lake.

Table 6. Water Quality Status of Sentani Lake at Station 3

No	Parameter	C_i	L_{ix}	Unit	C_{and}/L_{ix}	C_i/L_{ix} (new)
1	Turbidity	67	25	NTU	2,68	3,14
2	Color	57	50	TCU	1,14	1,28
3	TDS	682	1.000	mg/L	0,68	0,68
4	Temperature	29,4	30	oC	0,98	0,98
5	pH	7,3	7,5	-	0,97	0,97
6	Iron	0,37	1	mg/L	0,37	0,37
7	Flourida	0,13	1,5	mg/L	0,09	0,09
8	Hardness	412	500	mg/L	0,82	0,82

9	Manganese	0,01	0,5	mg/L	0,02	0,02
10	Nitrate	0,6	10	mg/L	0,06	0,06
11	Nitrite	0,22	1	mg/L	0,22	0,22
12	Cyanide	0,03	0,1	mg/L	0,30	0,30
13	Detergent	0,13	0,05	mg/L	2,60	3,07
14	Total Pesticides	0,01	0,1	mg/L	0,10	0,10
15	Coliform Total	38	50	CFU/100 mL	0,76	0,76
Sum						12,88
Average						0,86
Maximum						3,14
Plj						2,30
Information (water quality status)			Lightly polluted (slightly polluted)			

The results of the analysis of 15 parameters from station 3 (the mouth of the Hobay River) obtained a pollution index (Plj) of 2.30. This value is in accordance with the Regulation of the Minister of Environment of the Republic of Indonesia Number 115 of 2003 concerning Guidelines for Water Quality Status in index class $1 \leq Plj \leq 5$, which means that the category is lightly

polluted. There are two parameters that exceed the threshold value, namely turbidity and color, which is due to the large number of people doing gold panning downstream of the River whose waste is discharged into the River, the River water is slightly brownish, but the community still uses it for bathing and washing.

Table 7. Water Quality Status of Sentani Lake at Station 4

No	Parameter	C_i	L_{ix}	Unit	C_{and}/L_{ix}	C_i/L_{ix} (new)
1	Turbidity	34	25	NTU	1,36	1,67
2	Color	61	50	TCU	1,22	1,43
3	TDS	1.989	1.000	mg/L	1,99	2,49
4	Temperature	29,1	30	oC	0,97	0,97
5	pH	8,7	7,5	-	1,16	1,32
6	Iron	0,33	1	mg/L	0,33	0,33
7	Flourida	0,16	1,5	mg/L	0,11	0,11
8	Hardness	341	500	mg/L	0,68	0,68
9	Manganese	0,02	0,5	mg/L	0,04	0,04
10	Nitrate	0,32	10	mg/L	0,03	0,03
11	Nitrite	0,42	1	mg/L	0,42	0,42
12	Cyanide	0,06	0,1	mg/L	0,60	0,60
13	Detergent	0,08	0,05	mg/L	1,60	2,02

14	Total Pesticides	0,03	0,1	mg/L	0,30	0,30
15	Coliform Total	341	50	CFU/100 mL	6,82	5,17
Sum						17,59
Average						1,17
Maximum						5,17
Plj						3,75
Information (water quality status)			Lightly polluted (slightly polluted)			

The results of the analysis of 15 parameters from station 4 (the mouth of the Kamwaker Waena River) obtained a pollution index (Plj) of 3.75. This value is in accordance with the Regulation of the Minister of Environment of the Republic of Indonesia Number 115 of 2003 concerning Guidelines for Water Quality Status in index class $1 \leq \text{Plj} \leq 5$, which means that the category is lightly polluted. There are 6 (five)

parameters that exceed the threshold value, namely turbidity, color, TDS, pH, detergent and total coliform due to the presence of domestic waste from the Waena Settlement which is quite densely populated and the existence of a Slaughterhouse in Yoka Village, but can still be used to meet the needs of Sanitary Hygiene water.

Table 8. Water Quality Status of Sentani Lake at Station 5

No	Parameter	C_i	L_{ix}	Unit	C_{and}/L_{ix}	C_i/L_{ix} (new)
1	Turbidity	189	25	NTU	7,56	5,39
2	Color	18	50	TCU	0,36	0,36
3	TDS	98	1.000	mg/L	0,10	0,10
4	Temperature	31,8	30	oC	1,06	1,13
5	pH	7,6	7,5	-	1,01	1,03
6	Iron	0,05	1	mg/L	0,05	0,05
7	Flourida	0,11	1,5	mg/L	0,07	0,07
8	Hardness	216	500	mg/L	0,43	0,43
9	Manganese	0,01	0,5	mg/L	0,02	0,02
10	Nitrate	1,05	10	mg/L	0,11	0,11
11	Nitrite	0,12	1	mg/L	0,12	0,12
12	Cyanide	0,04	0,1	mg/L	0,40	0,40

13	Detergent	0,06	0,05	mg/L	1,20	1,40
14	Total Pesticides	0,03	0,1	mg/L	0,30	0,30
15	Coliform Total	210	50	CFU/100 mL	4,20	4,12
Sum						15,02
Average						1,00
Maximum						5,39
PI _j						3,88
Information (water quality status)			Lightly polluted (slightly polluted)			

The results of the analysis of 15 parameters from station 5 (the mouth of the Jaifuri River) obtained a pollution index (PI_j) of 3.88. This value is in accordance with the Regulation of the Minister of Environment of the Republic of Indonesia Number 115 of 2003 concerning Guidelines for Water

Quality Status in index class $1 \leq PI_j \leq 5$, which means that the category is lightly polluted. There are 3 (three) parameters that exceed the threshold value, namely turbidity, total coliform and detergent which is due to the large number of people using water in the River outlet area for washing and bathing.

A comparison of the pollution index (PI_j) to the five Sentani Lake research

stations can be seen in the following figure.

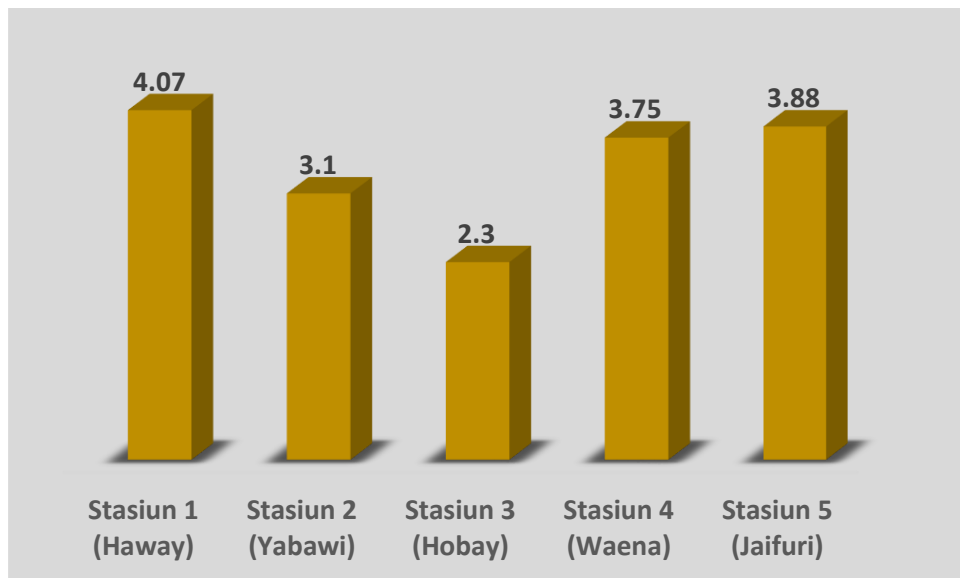


Figure 17. Diagram of Pollution index (PI_j) of Sentani Lake

At the figure 17, it can be seen that the five pollution indices (PI_j) of the five stations are in accordance with the Regulation of the Minister of the Environment of the Republic of Indonesia

Number 115 of 2003 concerning Guidelines for Water Quality Status with the pollution index having a light polluted quality status.

CONCLUSIONS

The water quality of Sentani Lake can still be used to meet the needs of Sanitary Hygiene (bathing and washing), but some pollution parameters have exceeded the threshold value. Based on the Ministry of

Environment of the Republic of Indonesia Number: 115 of 2003, the Sentani Lake water pollution index at all research stations is at a value of $1.0 \leq \text{Plj} \leq 5.0$ which means it is lightly polluted.

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